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TROPICAL DISEASES BULLETIN

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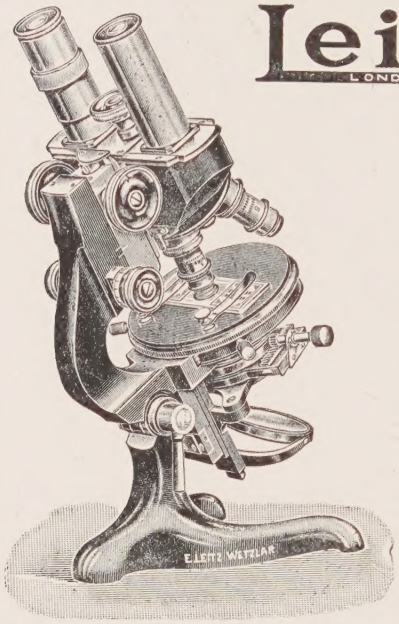

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TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 4.

YELLOW FEVER.

JAMES (S. P.). i. **The Protection of India from Yellow Fever.**—*Indian Jl. of Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 213-257. With 3 plans and 1 map. ii. **Note on the Practicability of Stegomyia Reduction in Indian Seaports.**—*Ibid.* pp. 258-262.

i. This report is a result of investigations into the conditions likely to affect the spread of yellow fever from South America to India and other Eastern ports, which might result from the commercial developments following upon the opening of the Panama Canal.

In the first section the distances between the various ports under discussion are considered and a table of distances in nautical miles is added. From this table, in so far as it relates to Indian ports, the author draws the following conclusions :—

"(1) The opening of the Panama Canal is not likely to be followed by direct traffic from Europe through the endemic area to India, for the distance between London and India is, on an average, 10,500 miles longer by the new route than by way of the Suez Canal. This is important because most of India's seaborne trade is with Europe.

"(2) It is not likely to be followed by direct traffic from the United States through the endemic area to India, for New York is, on an average, 6,800 miles, and New Orleans 3,200 miles, nearer to India by way of Suez than by way of Panama.

"(3) It is not likely to be followed by direct traffic from the endemic area *via* Panama to India, for much the shortest routes to that country from the West Indies, Mexico, the Central American Republics, the Panama Canal zone, Colombia, Venezuela, and Guiana will still be by way of Suez, and from Brazil the shortest route is by way of the Cape of Good Hope. Major TUCKER suggests that Jamaica may be a place from which there will be direct traffic to India, but if this were to happen, the route would surely be by way either of the Suez Canal or the Cape of Good Hope ; the distance from Jamaica to Bombay by the Suez route is about 5,100 miles shorter than by way of the Panama Canal. In this connexion it is noteworthy that the Republic of Panama already imports Burmese rice, which goes by way of Liverpool or Hamburg to Colon.

"(4) It is believed that the opening of the canal will result in a great increase of trade in the Pacific coast ports of South America, and it might be conjectured that direct trade between those ports and India will follow For many reasons this is very unlikely to happen ; but even if there were direct trade between, say, Peru or Chile and India, the best route would

(C15.) Wt.P.2413/35—22.12.13. 2000. 2.14. B. & F. G.11/4. A

be from Callao and Valparaiso *via* the Straits of Magellan and the Cape of Good Hope—for the distance from Valparaiso to Bombay by that route is nearly 4,000 miles shorter than by the trans-Pacific route."

It would thus appear that the spread of yellow fever to India, if such happens, will not be the result of direct trans-Pacific shipping to that country from or through the endemic area in Central and Southern America.

The same line of enquiry applied to ports further east than India leads to the result that beyond Singapore the conclusions are, with one important exception, the reverse of those arrived at regarding India; the distances to Japan, China, Australia and the East Indies will, in general, be much shorter by the new route, and for this reason direct traffic to these countries through and from the endemic area may be expected. By the new route Yokohama and Australia will be nearer to New York than to London, but the Panama Canal will not provide a shorter route from Europe to the countries east of Singapore, and this is important as indicating that the through traffic *viâ* the endemic area to the East will not be so great as has sometimes been anticipated. In summing up the enquiry the author says: "the new danger to the East" is a direct danger as far only as Hong Kong, and that the spread of yellow fever to the Straits Settlements and to India by the route which we have been considering cannot result except as a secondary event, subsequent to and consequent upon, the infection of ports in Japan, China, the East Indies, or Australia. The problem of immediate concern, therefore, is the possible spread of yellow fever, not to India, but to the other countries just named.

An account of the steamship companies at present engaged in the trans-Pacific traffic is included, and it is found that most of the traffic to the East starts from ports such as Vancouver and San Francisco, which are not now and are not likely in the future to be infected with yellow fever, but there is also (and has been for some years) a moderate amount of traffic from ports, especially on the Mexican coast, which at least must be regarded with suspicion.

It is by no means sure that the canal will increase the risk of the spread of yellow fever to the extent that has been anticipated, for the situation on the Atlantic side of the canal and in the canal zone itself is now very different from what it was in 1903, when Sir Patrick Manson first drew attention to the dangers now under consideration. Preventive measures have resulted in the disappearance of the disease from Panama, Colon, Havana and other Cuban ports, New Orleans, Rio de Janeiro, and nearly all the West Indian Islands, and as regards such ports on the Atlantic side of the canal as are likely to be engaged in trans-Pacific trade, not one can be named which is definitely believed to be endemically infected at present. It is further very improbable that the United States will cease to recognise their great responsibility in the maintenance of those measures which have been so successful in ridding the canal of disease; for the extensive use of the canal as a commercial highway would be greatly affected by the failure of these precautions.

On the whole it must be concluded that the present routes are not very favourable to the infection of Asia, and it only remains to endeavour to foretell whether future routes will be more so or not. The following four points are summarised:—

"(1) At present all ships which leave America for the trans-Pacific voyage to the East from San Francisco and more southerly ports use the Hawaiian Islands as the first place of call. The conditions in these islands are throughout the year favourable to the existence of yellow fever, but up to the present the disease has been effectually excluded. The authorities fully appreciate the danger of the introduction of yellow fever from Mexican ports, and very thorough precautions are taken. After studying the local conditions and arrangements in Honolulu I am of opinion that the port affords a strong protection against the infection of Asia and the East Indies.

"(2) On the usual route to Hong Kong the ships, after leaving Honolulu, pass northwards into latitudes not as a rule favourable to the life of mosquitoes, and the remaining ports of call are Yokohama and other Japanese ports and Shanghai. There is a serious gap in our knowledge of the conditions in these ports, for we do not yet know whether *Stegomyia fasciata* occurs in them or not. If it is present, and sufficiently abundant, the introduction of the yellow fever virus might lead to an epidemic, but the climate is such that the disease would entirely die out during the winter, and fresh importation would be necessary for its reappearance.

"(3) The climate of Hong Kong is more favourable to the existence and spread of yellow fever, but again we are ignorant of the presence or absence of *Stegomyia fasciata* there. In all probability a thorough search during the hot months would show that it is present, but quite possibly it is not very abundant.

"(4) The route from San Francisco *via* Honolulu to the Philippines does not necessarily take ships northward to Japan, but until San Francisco or Honolulu become infected such a route is not a cause for anxiety."

Though the foregoing facts must lead to a modification of opinion as to the degree of danger of the spread of yellow fever to the East and to India, the author strongly urges that they do not justify the conclusion that little or no action is at present necessary.

The following recommendations are made:—

1. The appointment of a medical officer in the endemic area who will be able to obtain continuous first-hand information as regards the actual shipping traffic and the measures that are taken to prevent the carrying of infection. A second medical officer might be appointed with Hong Kong as a centre, and it would be a great advantage to have a third with headquarters at Singapore.
2. The investigation of various subjects which have a direct bearing on the spread of the disease, such as the distribution of *Stegomyia fasciata*, the possibility of *Stegomyia scutellaris* acting as a carrier, and many other matters in connection with etiology and prevention.
3. India should give financial or other support towards the appointment of the intelligence officers, the establishment of a Central Intelligence Bureau, and the institution of any scientific enquiry. Secondly, steps should be taken to reduce the breeding places of Stegomyia in India. And thirdly an enquiry should be made into the possibility of the spread of yellow fever to India by way of the Cape of Good Hope.
4. The line of sanitary defence should be strengthened for our Eastern Colonies and for India, especially in Hong Kong, by the establishment of a modern quarantine station in that port adequate to the needs of a shipping centre of such importance.

Section III of the report (pp. 227-257) contains a general description of the conditions in most of the ports visited.

ii. In the note on the practicability of Stegomyia reduction in Indian seaports it is shown that many of the conditions, social and political, prevailing in India would prevent the adoption of those measures which have been successful in America. In India the problem resolves itself into one of an adequate water supply through pipes, which would render unnecessary the storage of water in cisterns or other receptacles which are the favourite breeding places of this

mosquito. It is suggestsd that the harbour of Madras and the contiguous area of Georgetown would be most suitable for a first experiment.

C. M. Wenyon.

van Loghem (J. J.). **The Yellow Fever Danger for Asia and Australia; especially after the Opening of the Panama Canal.***—*Jl. Trop. Med. & Hyg.* 1913. Sept. 15. Vol. 16. No. 18. pp. 292-293.

This paper shows that the danger referred to is a real one, in that *Stegomyia calopus* can remain infectious very long after having bitten a yellow fever patient; so if the mosquito finds on board ship the means of keeping alive, there is danger of the disease being carried long distances. Repeated experience of the occurrence of yellow fever among the crew and dock labourers during the unloading of ships has proved this. Further, in tropical seas Stegomyia not only remains alive on board ship but sometimes finds an opportunity of breeding. This is more likely to occur in more primitive slow-moving ships than in the faster and better ventilated newer ships. On this account it seems certain that as long as yellow fever occurs in America the chance remains of infected Stegomyiae being transported to Asia and Australia. When once transported the disease would have every chance of maintaining itself, since *Stegomyia calopus* occurs all over the world between about latitude 40° N. and S., and at various places in Asia and Australia these mosquitoes occur in such numbers and under such circumstances that yellow fever would be able to hold its own and be propagated further.

As regards precautionary measures to be taken in Asia and Australia, the author concludes that as Stegomyiae may be hidden in cargo and not discovered by inspection; as cases of the disease may escape clinical recognition; and as there is no means of identifying those healthy people who are in the incubation period of the disease, it will be necessary to fumigate every ship which has touched at an infected or suspected port in the Stegomyia zone, to keep in quarantine and observe for a few days the whole crew, and to remove all fever patients in mosquito-nets and isolate them in a mosquito-proof hospital. At the same time, the campaign against Stegomyia in Asian and Australian ports ought to be started with all energy.

C. M. W.

Flourens. **Note sur la dernière Epidémie de Fièvre Jaune au Sénégal.**—*Rev. de Méd. et Hyg. Trop.* 1913. Vol. 10. No. 1. pp. 31-34.

Several cases of yellow fever followed by death having been recorded in Senegal between October 1911 and March 1912, the author of the present note was recalled from the Soudan to administer the sanitary service in Baol and western Sine-Saloum. As no cases occurred for some months it was thought that no further danger existed, but the disease suddenly declared itself at Kehemer, and on September 30th

* Summary of communication presented at the XVIIth International Congress of Medicine, London, August 1913.

two deaths attributed to this disease occurred at Tivaouane. On October 7th news was received that Louga and Sakal were infected places and on October 12th a case occurred in Diourbel and two in Dakar, all of which terminated fatally. On October 17th the author himself became ill with the disease in Diourbel, and three other cases occurred in the period ending November 13th. Meanwhile the epidemic passed along the railway running from Thies to Kayes, with fatal cases amongst the railway employees at Kapine and Birkelane. Probably other cases unidentified occurred along this line.

The epidemic of 1911 commenced in the Gambia, passed along the line through Dakar, Thies, N'Dande, and ended with the last case at Tivaouane, on March 15th, 1912. The 1912 epidemic commenced, as already stated, at Kehemer, not very far from Tivaouane, and spread along the Dakar-Saint Louis line through Longa and Sakal, up to the end of September. At this time the infection was carried across from this line to Diourbel on the Thies-Kayes railway. The author can only explain this spread of the epidemic by assuming that the disease can be preserved in a latent or ambulatory form in the natives of the country.

C. M. W.

i. Hopkins (F. G.). **Report on Cases of Yellow Fever occurring in Accra in March 1913.** (Received in Colonial Office. July 7, 1913.)
ii. Muller. **Report on a Case of Yellow Fever in Abokobi.**— (Received in Colonial Office June 30, 1913.)

i. The report contains an account of seven cases of fever—five in natives and two in English residents—which were carefully examined for malaria and other parasites without any cause for the fever being discovered. All seven cases were diagnosed as yellow fever, and the report contains details of the course of the disease and treatment of the several cases, all of which recovered.

The principal features of the native cases, all of which were of a mild type, were fever, 103°–104° F., gradually falling to normal during the course of ten days or a fortnight, a varying degree of albuminuria, jaundice as indicated by colouring of the conjunctivae, and a certain amount of tenderness over the liver, which was enlarged in two cases. Examination of the blood for malarial parasites and pigmented leucocytes was negative in each case, nor could any cause for the illness be discovered in the faeces. Most cases showed at some time or other a decrease in the polynuclear and an increase in the mononuclear cells of the blood. All the cases, including the two Europeans, commenced their illness during the course of three weeks, so that the outbreak can be regarded as a mild epidemic of yellow fever.

ii. An account of a typical and fatal case of yellow fever occurring in a European—a missionary of the Basel Mission Station of Abokobi, Gold Coast.

C. M. W.

Johnston (J. E. L.). **The Pathology of Yellow Fever.** [Correspondence.] —*Lancet.* 1913. Dec. 6. pp. 1660-1661.

The writer draws attention to investigations undertaken by him in

conjunction with Scott Macfie on an outbreak of yellow fever which occurred in Lagos, in May 1913. The chief point is the finding in the red cells of "parasitic bodies which proved to be identical with the *Paraplasma flavigenum* described by Seidelin." These were fairly numerous in the blood, were present in every definite case, and should be of use, he writes, in diagnosis. They were present for several days, sometimes as late as the twelfth day, and were inoculable into guinea-pigs even as late as the eighth day. Guinea-pigs were most successfully infected, dogs and white rats were found susceptible. Guinea-pigs were also infected by sub-inoculation. Several stray dogs were found to harbour "very similar bodies—a point that may prove of importance in the spread of the disease."

C. M. W.

Macdonald (Angus). **Is Yellow Fever endemic in Jamaica?**—*A paper read before the Jamaica Branch of the British Medical Association, Dec.* 1912. 17 pp. 1913. Jamaica: Egbert S. Baird, Printer & Publisher.

The present paper deals with a report made by Captain Potter on the nature of the so-called vomiting sickness of Jamaica, which he considers to be no clinical entity, but simply yellow fever which must be regarded as endemic in the island. The author enters into a detailed discussion of Captain Potter's report, and comes to the conclusion that he has failed to establish his claim that yellow fever is endemic in Jamaica; for of 38 cases which were considered as possibly yellow fever not one showed the typical clinical picture or post mortem findings of this disease. The author believes that the term vomiting sickness includes several diseases, one of which is cerebrospinal meningitis. It is claimed that Potter has not excluded these cases nor has he made any attempt to fit in the distribution of his supposed cases of yellow fever with that of the *Stegomyia fasciata*. Accordingly, in Macdonald's opinion, it still remains to be proved that yellow fever is endemic in Jamaica.

C. M. W.

Seidelin (Harald). **On "Vomiting Sickness" in Jamaica.**—*Ann. Trop. Med. & Parasit.* 1913. Nov. 7. Vol. 7. No. 3B. pp. 377-478. With 5 plates.

Vomiting Sickness is prevalent in Jamaica during the winter months, and is responsible for a considerable mortality, chiefly amongst native children. The subject has already been investigated by Potter and Scott [see this *Bulletin*, Vol. 2, pp. 104–105.] Seidelin took up his stay at Kingston and investigated the subject from there. He saw, in all, 62 cases during his ten weeks' stay in Jamaica. The conditions of work made it impossible to investigate all epidemiological, clinical, anatomical, and microbiological details in each case as fully as might have been desirable. Further, as the author had to proceed to Africa the histological examinations of the various sections were not carried out in every detail.

Since 1905, when Ker drew attention to the prevalence of vomiting

sickness in Jamaica, great uncertainty has prevailed as to its nature. (1) The disease appears at a certain fixed time of the year, November to March, a time when the temperature varies greatly from day to night; (2) It rarely appears in towns, none of the cases reported coming from such situations; (3) The people attacked are chiefly, but not always, children; (4) It appears so suddenly and runs its course so quickly that medical men never hear of two thirds of the cases until after death has occurred; (5) Frequently several members of a family are attacked.

Potter believed that the majority of the fatal cases were yellow fever. Scott, on the other hand, that some, at any rate, were epidemic cerebrospinal meningitis. The author saw no cases of cerebrospinal meningitis of an ordinary type, but states that the *Diplococcus meningitidis* does occur in Jamaica, and quotes two cases seen in adults at the time that vomiting sickness was prevalent.

Five of Seidelin's cases were regarded as suspicious of yellow fever; notes of all these are given. In one case there was little doubt that this was the correct diagnosis, and the post mortem findings were typical.

In four other cases also the pathological lesions pointed to yellow fever, but the clinical and epidemiological characters made the author hesitate in pronouncing them so. In other cases malarial parasites were found, and were evidently the cause of the symptoms. As regards the pathological anatomy of the condition the most striking anatomical lesions are:—enlargement and hyperaemia of the lymphatic nodules; petechiae on the surface of the heart and in the gastric mucosa; necrobiosis of the pancreas, liver and kidneys, especially of the pancreas, and fatty change of these and other parenchymatous organs. There was often a marked hyperaemia of the spinal and cerebral pia, though in other cases this was very moderate, and in others limited to the cerebral pia. The intensity of the lesions differed very much, especially that of the fatty changes, which were most marked in the cases of one or two days' duration.

The pathological histology, the author believes, explains the most striking features of the disease, namely, the rapid course, the high mortality, and the haemorrhagic degeneration and necrobiotic phenomena just described.

The nature of vomiting sickness is very uncertain, but Seidelin believes that until further evidence is brought forward we must assume that there is such a disease and that it is a local one of Jamaica. The epidemiological evidence is rather against identifying it with yellow fever, and the classical clinical symptoms of that disease, such as fever, black vomit, jaundice and anuria, are almost constantly absent. These may, of course, be absent in cases of real yellow fever, but it is hardly conceivable that they should all be absent in practically all cases in large outbreaks. The most striking feature of all would be that these abnormal epidemiological, clinical and pathological characters, if the disease really were yellow fever, should have repeated themselves year after year in an absolutely typical manner. This certainly is a very strong argument that we have to do with a specific and typical disease.

As regards cerebrospinal meningitis, Seidelin states that Scott in his latest paper is less positive with regard to the essential importance

of his results, as far as vomiting sickness is concerned, than he was to begin with. The author does not discuss the results published by Scott, but limits himself to his own investigations, in which he was greatly assisted by that observer. His conclusions briefly are that at the present state of investigations the explanation which at first sight seems the most probable, viz., that vomiting sickness is simply a form of meningitis, cannot be accepted, and he believes that further investigations are therefore absolutely imperative.

It is possible that the cause may be a blood inhabiting, presumably protozoal organism, and that a diplococcus infection of the meninges occurs as a frequent complication, as a rule not giving rise to any marked anatomical lesions because of the rapidly-following death, but in a few cases producing a typical fibrino-purulent meningitis. Another possibility is that the causal organism may be parasitic in the intestine and produce exceedingly active toxins. Other theories, such as vomiting sickness being identical with malaria, with some form of helminthiasis, or with some kind of poisoning, find no support whatever from his observations.

[Seidelin's researches therefore do not advance the subject very much, and leave it in the uncertain position in which it was before. Possibly the disease is a specific one, due to some hitherto unrecognised organism.]

G. C. Low.

LEPROSY.

TRANSMISSION.

Paldrock (A.). **Wanzen und Schaben als Verbreiter des Lepraerregers.** [Bugs and Cockroaches as Propagators of Leprosy.]—*Dermatol. Centralbl.* 1913. Dec. Vol. 7. No. 3. pp. 66-71.

In the year 1907 Bassewitz reported a case of leprosy which he believed was caused by the *Acarus scabiei*. Two years later Ehlers investigated the intestinal contents of bugs, lice, fleas, and mosquitoes, which had bitten lepers. The *B. leprae* was found for only a short time after feeding. Sandes observed acid-fast rods in *Acanthia* [*Cimex*] *lectularia* 16 days after sucking the blood of a leper, and quoted the case of a boy who developed leprosy after being bitten by bugs, when visiting his infected father in a leper home. Long recorded an instance of a man, who resided in a leprosy-free village in Basutoland, spending a night in a hut which had been inhabited by a leper. He was bitten by bugs, and became a leper.

In the author's investigations Baumgarten's and Unna's methods of staining were used. In the former, decolorization of the fuchsine stained films is effected by the application of nitric acid alcohol, 1 in 11, for half a minute. In the latter, the thymen-victoria-blue stained specimens are treated with 30 per cent. nitric acid for 5 seconds, with alcohol, safranine, and a second application of the acid for 5 seconds successively. Unna states that living *B. leprae* are stained blue and dead yellow or rose.

Twelve hours after feeding *Cimex lectularius* on the excised nodules of lepers, bacillary forms of the *B. leprae* are seen no longer; the rods already are broken down into granules which disappear in a fortnight. In bugs fed directly on lepers, no trace of the *B. leprae* is present after the first 24 hours.

When the cockroaches, *Blatta germanica* and *Periplaneta orientalis*, are fed on lepromata, *B. leprae*, staining blue by Unna, and hence presumably living, are found in the intestinal contents for 14 days, together with rods which have degenerated. No acid-fast bacilli were found in control insects.

Other observers have not been successful in detecting *B. leprae* in bugs which have sucked leprous blood [see this *Bulletin*, Vol. 2, p. 502.]

C. Birt.

Smith (Allen J.), Lynch (Kenneth M.) & Rivas (Damaso). **The Transmissibility of the Lepra Bacillus by the Bed-bug.** (*Cimex lectularius* L.)—*Amer. Jl. of the Med. Sciences.* 1913. Nov. Vol. 146. No. 5. pp. 671-681.

Preliminary experiments with flies were made by placing them in vessels containing sugar, blood, etc., contaminated with Duval's acid-fast bacillus. These rods were recovered from the proboscis and legs, but not from the interior of the insect. At first it was found to be impossible to induce bugs to feed on blood, but this difficulty was overcome by stretching rat skin over the infected blood. According to Nuttall, if the antennae of the bugs are destroyed, this artifice is

not required.* Over a hundred bugs were infected with Duval's bacillus after ingesting contaminated blood; a general infection is caused, but the bacilli disappear in two to four weeks. No acid-fast rods were discovered in control bugs. Acid-fast bacilli were found in bugs which had fed on two lepers, from whom the authors state they isolated *B. leprae* by culture of the blood, but no more particulars are given. Bugs infected with Duval's bacillus did not transmit this microbe to frogs or fish. Smears made of the crushed skin of a guinea-pig, at the site of puncture by bugs infected with Duval's bacillus, contained acid-fast rods.

[Throughout this paper it is assumed that Duval's acid-fast bacillus is identical with *B. leprae*, but Duval himself has admitted that he was mistaken in this belief. (See this *Bulletin*, Vol. 2, p. 504.)]

C. B.

McCoy (George W.) & Goodhue (William J.). **The Danger of Association with Lepers at the Molokai Settlement.** *Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 7-10.

Of 119 healthy men and 106 women, Hawaiians or of mixed descent, living in the same house as lepers, 4·2 per cent. of the former and 4·7 per cent. of the latter contracted leprosy. Twelve Caucasian women who came into contact with lepers remained free from infection, but three of 23 Caucasian men developed leprosy after three, nine, and seventeen years of residence; Father Damien was one of these. The incidence of leprosy among the healthy residents of the settlement, was greater in times past; in the year 1886, 17 out of 178, and in 1888, 23 of 66 contracted the disease.

The risks of the most intimate association are not so great as might be imagined, for 93 out of 98 healthy men who married 133 leprous women escaped infection, as did 79 of 83 healthy women who married 116 leprous men.

C. B.

Bayon (H.). **An Address on the Clinical and Bacteriological Aspects of Leprosy. Delivered at the Royal Society of Medicine.** *Brit. Med. Jl.* 1913. Nov. 29. pp. 1420-1423. **The Leprosy Problem in the British Empire.**—*Lancet.* 1913. Nov. 29. pp. 1527-1530.

Leprosy is slightly contagious only for, on combining Sand's and Lies's Norwegian statistics, we find of 2,010 children born to 587 married couples in which the father alone was leprous 7 per cent. developed leprosy. 14 per cent. of 1,181 children of 361 couples in which the mother was infected, were attacked. 26 per cent. of 142 children of 45 couples in which both parents were lepers, became

* Hindle & Merriman. **The Sensory Perceptions of *Argas Persicus* (Oken).**—*Parasitology.* 1912-13. Vol. 5. No. 3. p. 216. The authors write:—"Haller's organ [on the first pair of legs] is olfactory in function and constitutes a means by which a tick is able to recognise its host. By depriving ticks of this organ it is possible by suitable means to cause them to feed on media other than blood, thus showing that a sense of taste is absent. *Argas persicus*, *Ornithodorus moubata* and *Hyalomma aegyptium* have all given similar results with regard to the latter point and we believe that this constitutes a method by which perhaps other blood sucking arthropods, after being deprived of the organ or organs necessary for the recognition of their hosts, may be made to feed on any desired medium."

leprous. According to KITASATO, 7 per cent. of the offspring fo Japanese lepers contract the disease. Husband and wife infection occurs in 3·8 per cent; brother and sister in 4 per cent.; and 2·7 per cent. of people in the same residence fall victims to leprosy. The author thinks that this low infectivity of the *B. leprae* goes far to explain the lack of success in cultural and animal experiments. Contagion cannot be ignored, for in North Germany the infection has spread concentrically from cases imported from Russia. Out of the 25 or 50 lepers now living in the United Kingdom, one has acquired the disease locally. Sir George TURNER contracted the ailment while he was Superintendent of the Pretoria Leper Asylum. Moreover the children of leprous parents rarely develop leprosy if they are taken away from them. Segregation of the lepers in the Philippines has reduced the admission rate by 90 per cent.

Chaulmoogra oil and its derivative, antileprol, in 3–5 cc. doses, given intramuscularly every three days for five months or more, are the best remedies for advanced nodular cases. Two cases of macular leprosy are cited, in which great improvement was observed after inoculation with an extract of Kedrowsky's bacillus. Spontaneous recoveries, or remissions lasting many years, may occur.

C. B.

BACTERIOLOGY.

HOLLMANN (HARRY T.). **The Presence of Acid-fast Bacilli in Secretions and Excretions of Lepers.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 15-22.

Seventy-five lepers were examined, 58 of whom were suffering from the nodular type, six from the mixed, and 11 from the anaesthetic type of the disease.

In the year 1891 GOLDSCHMIDT discovered acid-fast rods in the nasal secretion of lepers, an observation which has been confirmed by many workers. Hollmann detected acid-fast bacilli in the nasal mucus of 89·6 per cent. of the 58 nodular cases, in 66·6 per cent of the six mixed, and in 45·4 per cent. of the anaesthetic cases. Altogether 329 examinations were made, and in a note he says that bacilli were present, at some time, in all anaesthetic and mixed cases, and in all but three of the nodular cases.

Since BABES and KALINDERO found *B. leprae* in the saliva of lepers in the year 1888, not very much work has been done on the subject. The saliva of 53 lepers was examined 317 times; acid-fast bacilli were demonstrated in 13 of the specimens which were obtained from 10 nodular cases with lesions in the mouth, that is in 21·7 per cent.

Acid-fast rods were detected seven times in the sputum of four of 31 lepers suffering from cough, but in three of the cases the sputum inoculated into guinea-pigs set up tuberculosis.

The urine of 48 lepers was examined 377 times, acid-fast bacilli were found on 15 occasions in the urine of eight nodular cases, or in 7·1 per cent. of nodular lepers.

The faeces of four nodular cases were examined 671 times with negative result.

Two hundred and fourteen samples of sweat were obtained from 48 lepers; acid-fast rods were demonstrated eight times from six nodular cases, or in 14·2 per cent. of patients suffering from this type of leprosy.

Acid-fast bacilli were found in the tears of two lepers with lesions of the sclerotic, or in 14·2 per cent. of nodular cases. Altogether 205 specimens of the lachrymal secretion of 41 lepers were stained.

A bibliography of 34 references enhances the value of this excellent paper.

C. B.

Leboeuf (A.) & Javelly (E.). **Sur la Présence de Bacilles de Hansen dans les Ganglions superficiels de Sujets sains en apparence.** — *Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 607-608.

After referring to their own and Sorel's positive results, which have been published already, [see this *Bulletin*, Vol. 1, pp. 191 and 559] the authors announce that they have discovered the *B. leprae* in the inguinal glands of a healthy girl, the sister of a leper. The examination of the glands of nine other near relatives of lepers was negative. They think that the *B. leprae* invades the body through the skin.

C. B.

Fambri (Elena). **Osservazioni Anatomo-Patologiche Intorno ad un Caso di Lepra universalis.**—*Pathologica.* 1914. Jan. 1. Vol. 6. No. 124. pp. 10-14.

The case under discussion was that of a girl, aged 14, admitted to the Venice Civil Hospital, where she died in December 1912. The disease had been of the nodular variety, and was contracted in Brazil. The autopsy, which is very fully reported, brought to light a widely generalised infection with lesions in the lungs, spleen, liver, genital organs, and intestine. In addition to typical lepra cells and acid-fast rods, there were noted giant cells and caseous material, the giant cells having peripherally arranged nuclei. The bacteriological investigation consisted in attempting culture on media of a kind calculated to give a growth if inseminated with the tubercle bacillus, and the inoculation of laboratory animals with material obtained from the spleen, lungs, bone-marrow, contents of the infected Fallopian tubes, cerebro-spinal fluid, and the blood from the ascending cava. The cultures were negative on all the media used. Of the inoculated animals (rabbits, guinea-pigs and white rats), those treated with material from the lungs, cerebro-spinal fluid, and blood from the ascending cava, all survived. Inoculations with splenic material led to infection of both rabbits and guinea-pigs, the animals showing glandular infiltration, pulmonary nodes, and enlarged spleen. From the bone-marrow guinea-pigs only were infected. Especially remarkable were the results in a guinea-pig inoculated with the caseous contents of one of the Fallopian tubes, the inoculation being given subcutaneously in the interscapular region. At the site of injection a swelling the size of a pigeon's egg was formed, containing creamy pus, and rich in leprous cells. Around the resulting ulcer the tissues showed a tendency to spontaneous cicatrisation. On the animal being killed after three months, the lungs, spleen and liver were found greatly increased in size, dotted with yellow nodes, some isolated, others confluent, and the lymphatic glands were enlarged and caseous. Acid-fast bacilli were demonstrated in the scar tissue at the site of

inoculation, in the liver, spleen, lungs, in the glands, and in the left suprarenal capsule.

The conclusion of the author is that, in the uncertain state of our knowledge as to any final and conclusive test for the differentiation of the bacillus of KOCH from that of HANSEN, the mere fact of infection of guinea-pigs is not sufficient to prove the presence of tubercle bacilli. Having regard to the undoubted leprous nature of the original infection, and to the fact that material from the lungs led to no symptoms in experimental animals, there is much evidence to support the conclusion that the generalized infection in the lungs was pure leprosy. The lesion in the Fallopian tubes was probably a mixed infection, in which both tubercle and leprosy participated, while the results of the investigation do not justify any absolute conclusion as to whether the lesions in the spleen and bone-marrow were mixed infections or not.

[The presence of giant cells and caseous material in the original case, and the findings in the animals inoculated, make it clear that the infection was one of mixed tubercle and leprosy. This once admitted, one sees no reason for discussing whether any given organ presented a pure or mixed infection, while the suggestion that the results point to the infection of guinea-pigs with lepra bacilli is hardly justifiable].

S. L. Cummins.

CLINICAL.

McCOY (George W.). **Glandular Tuberculosis among Lepers at the Molokai Settlement.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 3-6.

In a period of nine months ten cases of tubercular glands were observed among 650 lepers; the axillary glands were affected in seven, the inguinal and femoral in three, the cervical and supratrochlear in one each. In nine of the patients there was no evidence of tubercle in other parts of the body. All were adults. Now PARK and KRUMWIEDE in their study of glandular tuberculosis* found that 25 only, out of a total of 119 of those attacked, were 16 years of age or over; moreover in no more than eight of the 119 were the axillary and inguinal glands infected. In the glands of two lepers suffering from the anaesthetic form, the acid-fast bacilli were few; but in the other eight in which the disease was of the nodular or mixed type, acid-fast bacilli were numerous; hence it is probable that the glands contained both *B. leprae* and *B. tuberculosis*. Cultures of the tubercle bacillus were obtained directly from the glands of two by culture on egg media, and in the rest by passage through guinea-pigs. The growths showed little virulence to rabbits when 1–20th of a loop of a 22-day culture was inoculated intravenously; also the proliferation was rapid on glycerine egg; hence the strains isolated were of the human type of *B. tuberculosis*.

C. B.

CLEGG (Moses T.). **Absence of Luetin Reaction on Lepers showing a Positive Wassermann Reaction.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 11-14.

Luetin is the name given by NOGUCHI to dead cultures of the *Tre-*

* *Jl. of Medical Research*, Vol. 13, p. 363.

ponema pallidum grown by him. When this substance is injected intradermically, an inflammatory area appears at the site of inoculation in most cases of tertiary, hereditary and latent syphilis.

Since the year 1908, it has been shown by many investigators that the serum of lepers is often positive to the Wassermann test, although there may be neither history nor signs of syphilis. Clegg found that 11 of 24 lepers responded to the Wassermann test; although reliable histories could not be obtained, there were no other indications of specific disease in these 11 patients. The luetin reaction was negative in all.

C. B.

McCoy (George W.). **Fecundity of Hawaiian Lepers.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 23-25.

The general birth-rate of the total population of 191,909 was 26·82 per thousand in 1910, but this may be an underestimate, since the registration of births is sometimes neglected; the birth-rate of the leper settlement was 28·1 per thousand for that year. Since 1900 the average birth-rate in the leper population of an annual average of 850 has been 19·26 per thousand; when both parents were lepers, average annual number in this group 748, the birth-rate was 17·38; when the mother was leprous and the father healthy, number 55, it was 47·48; when the father was a leper and the mother healthy, number 48, it was 16·02 per thousand per annum.

The author concludes :—

(1) The birth-rate of the Molokai Settlement is probably about two-thirds as high as that of the non-leprous members of the same race outside, but the data for an entirely just comparison are lacking.

(2) The birth-rate among lepers appears to depend on the fertility of the male, which probably is materially reduced.

(3) The fertility of the female does not appear to be impaired.

C. B.

Treatment.

de Verteuil (F. A.). **Report by the Medical Superintendent of the Leper Asylum, Trinidad.**—Report dated Sept. 18, 1913. Received in Colonial Office, Oct. 29, 1913.

Nastin, chaulmoogra oil and antileprol were used in the treatment of three cases of nodular leprosy, which lost all signs of the disease; salvarsan also was given to two of them. In two anaesthetic lepers, an arrest of the disease occurred after 38 and 67 injections of nastin. The remedies must be continued for two or more years. Nastin is contra-indicated in ulcerating leprosy.

C. B.

Scott (L. Bodley). **The Nastin Treatment of Leprosy.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 352-383.

This paper, in which the author analyses the results in 49 cases observed in the Sylhet Asylum, Assam, is important, as there are not

many published accounts of the effect of Nastin in comparatively large groups of cases, and continued for considerable periods.

Methods of treatment.—Only Nastin B1 was used, a full tube being injected at each dose. The injections were given intramuscularly in the interscapular region, the skin being sterilized with iodine. The intervals between injections varied, but the author is inclined to think that the irregular fortnightly dose [*sic*] gives the best results. DEYCKE's latest plan of intermittent treatment was not systematically tried.

The results are shown in the following table.

Length of time under treatment.	"Cured."	Greatly improved.	Considerably improved	Somewhat improved.	Stationary.	Worse.	
3 years and over ..	1	—	—	—	—	—	
2½ years and over ..	—	1	—	—	—	—	
2 years and over ..	—	2	—	—	—	1	
1½ years and over ..	1	1	1	—	—	—	*Intercurrent dysentery. Leprous symptoms had improved.
1 year and over ..	4	3	3	5	1	2*	
9 months and over..	—	4	4	3	—	1	
6 months and over..	1	1	2	1	—	—	
Under 6 months ..	1	—	2	1	1	1	
Total ..	8	12	12	10	2	5	=49

"Cured" means complete restoration to health, strength, and working power, with loss of every symptom which causes inconvenience or incapacity. It does not mean in every case complete disappearance of every sign of leprosy.

[In assessing the results of the above table, it should be remembered that, in all attempts to treat very chronic conditions by vaccines, it is necessary to persist in the treatment for a considerable time. It will be noticed that in the 24 cases treated for a year and over the "cures" and those "greatly improved" amount to 13 out of 24, or more than half, while in 23 cases under treatment for less than a year, these groups amount to 7, or less than one-third. It would be natural to expect the reverse if the alleged improvement were due to suggestion only, or to a temporary benefit from asylum conditions.]

The results of the treatment on the principal symptoms are tabulated separately, and are of much less importance than the general results, since the tendency of the disease to improve in one manifestation while progressing in other respects must necessarily vitiate observations founded on separate symptoms. The relief of pain and the return of sexual power under the treatment are points of great interest, especially the latter, as there is reason to think that loss of sexual power is progressively increased during the course of untreated leprosy. In summing up his results, the author asks: "Are the

results of the Sylhet cases such as might be expected in the natural course of leprosy treated by any other method or not at all?" Putting aside the question of cure [a word which the author uses rather injudiciously, in spite of the fact that he adds a definition which modifies the expression] the improvement noted in 85 per cent. of the cases constitutes, in his opinion, sufficient ground for a very favourable conclusion. "The good effects are not rapidly striking. They are slowly and gradually developed, and are often not easily observed. They are nevertheless found to be substantial when treatment is sufficiently prolonged, and a careful estimate made of its results." The results of Nastin treatment, as published by other workers, are summed up under the headings of "favourable" and "unfavourable." The author then draws a comparison between his own results and those reported in a much larger series of cases by K. S. Wise, from the Mahaica Leper Asylum, of British Guiana. [(Report to Government of British Guiana, March 1911) See also this *Bulletin*, Vol. 1, p. 197], and notes the very different conclusions drawn as to the value of Nastin. He remarks on the curious fact that in the published reports "almost all the experiments in India, Persia, and Turkey have given good results, the European reports vary, the Far Eastern and Australian reports are all unfavourable, and the great majority of the experiments amongst the African races have been failures, including those of British Guiana." As a possible explanation of these differences the author suggests that the virus of leprosy may vary in different places in a manner corresponding, perhaps, to the three racial divisions of the Old World, Aryan in West and Southern Asia and in Europe, Mongolian in North and Eastern Asia, and Negroid in Africa. [This interesting suggestion would be more easily defended on a geographical than a strictly racial basis, since the movements of mankind in very early times are much too uncertain, and the anthropometric and philological observations much too inconclusive to justify the placing of the various leprous communities under the headings suggested by the author.]

S. L. C.

Heiser (Victor G.). **Leprosy. Treatment of Two Cases with apparent Cure.**—*U.S. Public Health. Rep.* 1914. Jan. 2. Vol. 29. No. 1. pp. 21-22.

Dr. Heiser has already reported two cases [this *Bulletin*, Vol. 2. p. 513], treated with apparent success by means of hypodermic injections of chaulmoogra oil and resorcin combined with vaccine therapy. In the two cases now recorded no vaccine treatment had been given, so that the results, if attributable to treatment, are due to the injections of chaulmoogra oil and resorcin only. The cases were very mild. In the first case, a female aged 11 years, suffering from macular leprosy microscopically confirmed, the injections were given at weekly intervals in doses rising from 1 cc. to 12 cc., and then gradually diminishing to the original dose, this diminution being succeeded by another rise to the maximum. The course lasted eight months. Following the inoculations, the macules ulcerated, and the ulcers then gradually healed. Microscopical examination of the originally infected sites was negative, nor was there any clinical evidence of leprosy after the

treatment. In the second patient, a Filipino male aged 40, the leprosy was of the macular type, and the diagnosis was confirmed microscopically. Treatment by chaulmoogra oil injections was continued for less than four months, the doses rising from 1 cc. to 5 cc., given into the buttock at weekly intervals. Larger doses could not be tolerated, as they were followed by palpitations and precordial distress. The patches healed, apparently without ulceration, and microscopic examination was negative six months after the inception of treatment, when the patient was discharged from hospital. [The subsequent history of these cases will be awaited with interest.]

S. L. C.

Turkhud. **Treatment of Leprosy with Captain Williams's Vaccine.**—*Report of the Bombay Bacteriological Laboratory for the year* 1912. pp. 26-29. (1913. Bombay: Government Central Press.)

Of 59 cases of leprosy, in various parts of the world, treated with a vaccine prepared from a streptothrix isolated from a leper by Williams, improvement is reported in 21. The records vary with the observers; thus Watkins-Pitchford noted no beneficial effect in 10 lepers at the Pretoria Asylum. Turkhud himself states that improvement in some cases, in his experience, is very definite, though gradual. The injections must be repeated every ten days for months; sometimes a severe reaction results.

C. B.

Janin (Francisque). **Essai de Sérothérapie de la Lèpre.** *Rev. de Méd. et d'Hyg. Trop.* 1913. Vol. 10. No. 2. pp. 81-89.

Carasquilla, and after him Laverde, endeavoured to prepare an antileprous serum by immunizing animals with the blood, serum, and fluid expressed from lepromata. Metchnikoff, however, showed that such a serum was cytotoxic rather than antitoxic or bactericidal; and that analogous effects are produced by the serum of a goat inoculated with normal human blood. The author applied blistering fluid or plaster to portions of the skin of lepers in which the nodules were numerous, and injected eight to ten cc. of the serum resulting into the same or other patients. His first case was one of nodular leprosy of five years' standing; after six injections of the patient's own serum, given at intervals of ten days, the lepromata disappeared, and the skin regained its normal suppleness. A second leper, who had been suffering from the anaesthetic form of the disease for four years, was benefited by three injections of the serum of the first case. A subject of macular leprosy, who was in feeble health, improved considerably after six doses of his own blister serum. Another similar case received four injections, after which the eruption grew paler, and sensibility was restored in the more recent patches. Four injections of this man's serum were given to a girl, who had been an anaesthetic leper for four years. No change was noted in the lesions, but her health improved rapidly. Four doses of the same serum were administered to a man broken down by anaesthetic leprosy of ten years duration, who had perforating ulcer of his foot; this healed and he became stronger, but the leprous areas of the skin remained unaltered. Hence the author concludes that the blister exudate of lepers exerts a specific

effect; a sharp febrile reaction sometimes occurs after the first injection. He thinks that injections of normal horse or ox serum, local treatment by hot baths, lotions, massage, and Bier's method are useful auxiliaries. He has employed this leper blister serum, which has been filtered or centrifuged, as a prophylactic remedy in doses of 2 to 8 cc. It excites a mild reaction only in healthy people.

C. B.

Unna, jun. (P.). **Ueber Diathermiebehandlung bei Lepra.** [The Diathermic Treatment of Leprosy.]—*Berlin. Klin. Wochenschr.* 1913. Nov. 17. Vol. 50. No. 46. pp. 2138-2140.

No lasting beneficial effects have been obtained in the treatment of leprosy by means of X-rays, Finsen-light, or ultra-violet rays; transitory improvement may occur, but this is often not so marked as that after the application of cheaper chemical and surgical procedures. Diathermy gives better results. [The term diathermy is given to the therapeutic heating effects of high frequency currents. If the oscillations are sufficiently frequent, the current passes through the human body without the manifestation of the ionic phenomena, shock, muscular contractions, and painful sensations; but heat is generated to a considerable depth. If one electrode be large, and the other small, the temperature of the latter is the greater, and if its size be still further diminished, it becomes a cautery. De Forest's needle is such an electrode.] Unna in the last three years has used diathermy in the treatment of seven cases of nerve leprosy, applying 0·5 to 0·7 milliampere of current for five minutes on six to 42 occasions. In most of these cases the infiltration of the nerves was lessened, the neuralgia alleviated, and the paraesthesia diminished. Anaesthesia remained unchanged except in one, in which it became less. Not only were the pains relieved almost immediately, but pressure on the nerves could be borne in patients in which the neuralgia had resisted all other treatment.

The high frequency current was applied with de Forest's needle to the nodular lesions of two lepers. In one the needle was introduced into all the nodules under anaesthesia; the lepromata were destroyed, but the ulcers which resulted were slow in healing. In the other, infiltrations of the penis, glands and leg were treated in like manner under cocaine, with benefit. This method of cauterization is preferable to, and less painful than, excision or Paquelin's cautery. The author concludes:—

Diathermic treatment causes the relief of pain in leprosy; no other remedy approaches it in its analgesic effects, and in alleviating neuralgic attacks. Under it, deep-seated infiltrations disappear in a comparatively short time. The destruction of lepromata with de Forest's needle is a better method of removal than the actual cautery or excision.

C. B.

de Verteuil (F. L.). **The Action of Radium on the Lepra Bacillus.**—*Arch. of the Röntgen Ray.*—1913. July. Vol. 18. No. 2. (No. 156). p. 53.

It was shown by Helen Chambers and Russ that the alpha and beta rays from small quantities of radium are bactericidal in vitro. The author irradiated the nodules of a leper with soft beta rays

obtained by the application of a radium varnish apparatus containing 80 mgm. of radium bromide of 500,000 activity, enclosed in rubber-cloth, for one hour. The lepromata became smaller, and after the 13th day granular degeneration of the *B. leprae* was noted, which progressed until all the rods were reduced to small granules in the third week. He suggests the use of radium emanation by inhalation, or in solution for the treatment of leprosy.

C. B.

Prevention.

White (Charles J.). **What shall we do with our Lepers?** [Editorial]. —*Jl. Cutaneous Diseases, incl. Syphilis.* 1913. Nov. Vol. 31. No. 11. (Whole No. 374), pp. 790-801.

There are few lepers in the United States, except in Louisiana, California and Minnesota. Different States adopt different laws. In New York the leper is placed under no control; in Massachusetts and Louisiana he is isolated in a leper hospital. In many parts when a leper is discovered, he is shunned or expelled by the inhabitants. It is suggested that a national leper ayslum should be established in some island off the American coast.

C. B.

Historical and General.

McCoy (George W.). **A Brief History of Leprosy in Hawaii.**— *Military Surgeon.* 1913. Dec. Vol. 33. No. 6. pp. 522-527.

The disease was first recognized in the person of a Captain of the Palace Guard in 1840. It was probably introduced by the Chinese. By 1863 the disease was evidently very prevalent, as 50 cases were recognized by a physician in the island of Lahaina, ten more having died in the preceding year. The first law of segregation was passed in 1865, the duty of isolating lepers being vested in the Board of Health. A settlement for lepers was instituted on a peninsula looking northwards from the island of Molokai, and a Hospital opened at Honolulu for the treatment of cases. At first there was no active antagonism, though many cases concealed themselves. Later, vigorous opposition was made to forcible segregation. The area of the settlement is several thousand acres in extent, and since 1895 has been entirely devoted to the use of the lepers, the last of the owners having been bought out by the Government in that year. A leper may be accompanied, in certain cases, by a healthy person, usually a husband or wife. Leprosy has been a ground for divorce since 1868. Of 728 cases now under observation 623 are Hawaiians, the remainder foreigners of European or Asiatic origin. During the first 20 years of the settlement, children born of leprous parents were allowed to remain in the settlement. Homes now exist in Honolulu for the non-infected children of infected persons. The birth rate in the settlement is by no means as small as might be expected. The figures available indicate that leprosy is without unfavourable influence on the fertility of the female, while it reduces that of the male.

In addition to the homes for healthy children of leprous parents, there is also a Receiving Station at Honolulu, where cases may be observed and treated for six months before being sent to the settle-

ment. The expense, which falls on a population of about 200,000, is very heavy, as shown in the appended table.

Year.	Amount spent. (dollars.)	No. of Lepers.	Cost per head.
1870	17,016	392	44·68
1875	29,698	754	39·25
1880	43,740	589	74·26
1885	54,131	663	81·65
1890	169,671	1213	139·90
1895	116,447	1087	107·12
1900	118,880	983	120·93
1904	149,325	994	150·22
1905	132,250	858	151·11
1906	96,413	828	116·39
1907	115,810	798	145·12
1908	165,662	791	209·43
1909	141,725	723	196·02
1910	162,843	614	265·21
1911	204,546	592	345·52
1912	231,778	728	318·38

It should be noted that the apparent decrease in the number of cases since 1890 is to be associated with a diminution in the number of Hawaiian natives rather than with any true fall in the incidence of the disease. From time to time there has been an agitation for local segregation in the various islands concerned, instead of the sending of all cases to Molokai. In the opinion of the author, a system of local segregation and medical inspection of the class of people that furnishes the majority of the cases would be of the greatest benefit

S. L. C.

Sadikoff (Ivan). **Ueber die "Lepra-Frage" in Kurland.**—*Lepra.* **1914. Jan. Vol. 14. No. 3. pp. 125-130.**

In 1892 there were from 100 to 120 persons suffering from leprosy in Courland (Russia). At the present time there are between 180 and 200, perhaps more, of whom 150 are accommodated in the four Leprosoriums. These institutions have existed for 17 years, but have not yet had any very decided effect in controlling the leprosy amongst the population. The steady diminution in other parts of northern Europe, where the question of the isolation of lepers has been more thoroughly faced, affords a marked contrast to the actual increase in Courland during the same period. In Norway, for instance, there were 2,833 cases in 1856. This large number had been reduced to 438 in 1907. Similar results, on a smaller scale, have been obtained in East Prussia, where leprosy has been stamped out of the Memel district since 1893, though it was steadily increasing before that date. Sadikoff devotes the greater part of his paper to a consideration of the administrative details necessary to improve the conditions obtaining in Courland, the main principles contended for being (1) a more thorough inspection and registration of the lepers living in their own homes; (2) an increased capacity for accommodation of cases in the Leprosoriums: and (3) united, instead of independent, action by the various Societies now existing for the control of leprosy.

S. L. C.

Biehler (R.). **Die Krebssterblichkeit unter den Leprakranken des Rigaschen städtischen Leprosoriums.** [Cancer Mortality Rate among Lepers in the Municipal Leprosorium at Riga.]—*Lepra*, 1914. Jan. Vol. 14. No. 3. pp. 141-148. With 3 figs.

The author discusses the question of the alleged relative immunity to malignant new growths in persons affected with leprosy, and quotes the findings of Munch-Söegaard who, working in Norway, recorded a cancer death rate of 1·2 per cent. in 1,204 persons dying of leprosy at ages of 35 and upwards during 44 years, and compared this with a cancer mortality of 9·1 per cent. in the general population within the same age-limits over a period of 24 years. With the conclusion drawn from these figures, that "Leprous persons possess a relative immunity against malignant new growths," Biehler is unable to agree on the following grounds.—In the municipal Leprosorium at Riga, from October 1891 to November 1913, 473 patients have been observed. Of these, 194 have died (87 males and 107 females). Using only those cases where the results of post mortem examinations are on record, 10 patients (6·2 per cent.) out of 160 persons dying with leprosy, have been found to have suffered from malignant disease (carcinoma), or 5·2 per cent. if the figure be calculated on the whole 194 deaths. Apparently no figures are available as to the proportion of the cancer deaths to the total mortality in the general population in Russia, but some idea may be obtained from the deaths recorded in the Riga Town Hospital between 1905 and 1913. During this period there have been 422 cancer deaths (5·27 per cent.) in a total of 8,005 deaths from all causes, a figure exactly corresponding to the total cancer death rate, as compared to the total death rate from all causes in the Leprosorium. Very full notes of two male cases of well established leprosy, in which carcinoma supervened, are given, with photographs in illustration of the lesions.

The conclusions drawn are as follows :—

1. That the cancer death rate amongst lepers in the Riga Leprosorium is the same as in the Town Hospital (5·2 per cent.)
2. That in both institutions the cancer deaths occur in persons of cancer age.
3. That the proportion of cancer cases is about the same in males and females, both in the Leprosorium and in the Town Hospital.
4. That the figures furnished by the Riga Leprosorium lend no support whatever to the theory that an immunity, or even a diminished susceptibility to cancer, exists amongst persons suffering from leprosy.

S. L. C.

Rat Leprosy.

McCoy (George W.). **Observations on naturally acquired Rat Leprosy.** —*Treasury Dept. U.S. Public Health Bull.* 1913. July. No. 61. pp. 27-30.

In San Francisco, during the years 1908–11, rat-leprosy was found in 186 of 200,000 rats examined ; 38 per cent. of the infected rats were males, and 62 per cent. were females, or in nearly the same ratio as that of the healthy rats caught. Irregularly circular patches of alopecia were present in nearly half of the leprous rats, most often on the back of the head. Ulceration over subcutaneous nodules was

found in 22 per cent., the granular whitish discharge of which contained numerous acid-fast bacilli. A diffuse subcutaneous yellowish white layer resembling fat, in which were many acid-fast rods, was noted in all but four of the rats; the lower part of the sternum, the axillae and groins are the most frequent sites of this infiltration. The lymphatic glands were enlarged in 87 per cent. of the cases; yellowish granules or wedge-shaped areas containing the bacillus were commonly seen, but acid-fast rods were discovered in glands which appeared normal. The internal organs were not affected except in two instances, in which granules were found beneath the capsule of the spleen. Nephritis was discovered in 54 per cent. of the leprous rats, but in 2 per cent. only of the other rats; the bacillus was not detected in the kidneys. Acid-fast bacilli were not demonstrated in the young of infected rats.

C. B.

Priestly (Henry). **Rat Leprosy in North Queensland.**—*Australasian Med. Gaz.* 1913. Nov. 1. Vol. 34. No. 18. (No. 459). pp. 405-406.

Of 220 rats examined in Townsville, North Queensland, 12 *M. decumanus* were infected with rat leprosy, six with the lymphatic and six with the musculo-cutaneous form of the disease. In several rats the infected glands were not enlarged. The bacilli were sometimes found in the apices of the lungs but not in other organs. Cultures failed. Acid-fast bacilli were discovered in Laelaps, a common acarine ectoparasite of leprous rats.

C. B.

PLAGUE.

Bacot (A. W.) & Martin (C. J.). **Observations on the Mechanism of the Transmission of Plague by Fleas.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 423-439. With 3 plates & 4 text figures.

The Commission for the Investigation of Plague in India came to the conclusion in 1907 that it was possible for a rat to become infected by rubbing the faeces of plague-infected fleas into recent flea-bites, but gave no opinion as to whether this was the usual method of infection. They found no bacilli in the salivary glands of the fleas, nor anywhere outside the alimentary tract. Bacot and Martin were equally unsuccessful, and it seems certain that transmission is not, as is the case with malaria and sleeping sickness, occasioned through infection of the salivary glands. They were able to infect rats by applying to recent flea-bites an emulsion of the stomach-contents of infected fleas, but obtained a higher proportion of successes (90 per cent. as against about 22 per cent.) when the cut surface of the spleen of a rat dead from plague was applied to the bites. This is attributed to a greater virulence of the bacilli in the latter case, which were found not to be taken up by human phagocytes, whereas the bacilli from the stomachs of fleas were freely ingested by phagocytes. Infection by the bacilli of flea-faeces can undoubtedly occur, but the authors show that this is not the only way in which the flea can infect. Under conditions precluding the possibility of infection by dejecta, it was found that two species of flea, *X. cheopis* and *C. fasciatus*, fed upon septicaemic blood, can transmit plague during the act of sucking, and that certain individuals suffering from a temporary obstruction at the entrance to the stomach were responsible for most of the infections obtained, probably for all.

In a proportion of infected fleas the development of the bacilli takes place to such an extent as to occlude the alimentary canal at the entrance to the stomach, choking the proventriculus and extending into the oesophagus. Fleas in this condition are not prevented from sucking blood, but they only succeed in distending the already contaminated oesophagus, and on the cessation of the pumping act some of the blood is forced back into the wound. Such fleas are persistent in their endeavours to feed, which renders them particularly dangerous. In the course of some days the culture blocking the proventriculus may autolyse and the passage again become pervious, and such fleas do not necessarily die from the obstruction. They are, however, for the time incapable of imbibing fresh fluid, and are in danger of drying if the temperature is high, and the degree of saturation of the atmosphere low. Their length of life must be short when hot, dry weather sets in, and it is suggested that this fact may to some extent explain why, in India, epidemic plague is confined to the cooler and moister seasons, and particularly why in Northern and Central India the epidemics are abruptly terminated on the onset of the hot, dry weather.

J. Henderson Smith.

Teague (Oscar). **A Further Note upon the Influence of Atmospheric Temperature upon the Spread of Pneumonic Plague.**—*Philippine Jl. of Science.* Sect. B. Trop. Med. 1913. June. Vol. 8. No. 3. pp. 241-252.

Tables are given of houses at Harbin and Changchun in North Manchuria, with details as to their construction, mode of heating, and the temperatures recorded inside and outside during the month of February 1913. Many of these houses were plague-infected during the great winter epidemic of 1910–1911, and the writer finds in this record further support for his view that the atmospheric temperature affects the spread of pneumonic plague. It is rare, he states, to find in a warm climate an atmosphere with only small deficit of water-vapour, though this is very common in cold climates; and in such an atmosphere droplets of sputum persist longer than in one with a large deficit, and plague bacilli in such exhaled drops are less quickly dried and survive longer.

J. H. S.

Wu Lien Teh. [G. L. Tuck.]. **First Report of the North Manchurian Plague Prevention Service.**—*Jl. of Hygiene.* 1913. Oct. Vol. 13. No. 3. pp. 237–290. With 11 plates, map and 4 plans.

This Service was instituted by the Chinese Government after the International Plague Conference at Mukden in 1911. Its primary object is to provide a medical service (including hospitals) ready to cope with any outbreak of plague in North Manchuria and capable of studying the local conditions affecting the disease. This first Report contains a short account of previously recorded occurrences of plague in the area supervised by the Service, and a record of the work carried out since its effective organisation. This has largely consisted of an investigation into the tarbagan (*Arctomys bobac*), whose relation to the great epidemic of 1910–1911 has been frequently discussed. Statistics are given as to the extent of the trade in the skins, details regarding the natural history of the animal and the bloodsucking-parasites it harbours (which included fleas in large numbers, all of them *C. silantievi* Wagner (1898), and ticks), the mode and seasons of trappings, the influence of the trade upon the local population and other relative points. No satisfactory evidence was obtained that human plague in these regions was commonly due to plague in the tarbagan. The rumours that the animals were dying in large numbers in this or that place could never be substantiated, and no reliable authority could be obtained for the statement that tarbagan epizootics were associated in time with outbreaks of plague in man. So far there is only one instance on record of a tarbagan being found infected with *B. pestis*. That pneumonic plague once started might spread with extraordinary vehemence is shown by the evidence given in the Report of the crowding of the population in the houses, *e.g.* in one hut 15 feet square by 12 feet high more than 40 people were packed in three tiers of berths with, in winter, closed windows.

J. H. S.

Sacquépée & Garcin. **La Peste des Ouled Fredj (Maroc). La Peste des Animaux domestiques. Remarques sur la Contagion de la Peste et sur sa Prophylaxie.**—*Arch. de Méd. et u Pharm. Militaires.* 1913. Dec. Vol. 62. No. 12. pp. 561–579.

Plague apparently has recurred for years past among the tribes of Morocco, breaking out afresh here and there each summer and dying down in the winter. In 1910 the outbreak was more persistent, and in 1911 a violent epidemic began, which attacked numerous tribes and caused 14,000 deaths among the natives during 1911–1912. The disease apparently is brought each year to the Doukalla tribe by the Draouat, a tribe living in the south-west of Morocco and migrating North each summer to assist the Doukallas in agriculture. In 1910, they did not return South in winter, and the summer of 1911 brought a fresh immigration of Draouat, and these also brought plague with them. The seriousness of the epidemic induced the French authorities to send a mission to attempt to check its spread, and this paper gives some of the observations made by these officers.

The human epidemic is apparently bubonic in type [this is not definitely stated], and *B. pestis* was found in the glands, but a striking feature was the infection of domestic animals. Two camels (one examined 24 hours after death), a sheep, a lamb, a mule (found dead), and a cat were all found infected with organisms recognised as *B. pestis* [no indication of the method of diagnosis], and the authors were convinced without having any actual proof that dogs and probably cattle also were attacked. Rats, on the other hand, were apparently scarcely attacked. No signs of unusual rat-mortality were found, and of 102 [caught alive ?] fully examined, only one was found to contain *B. pestis*. The authors conclude that a rat epizootic played no part in the spread of the human disease in this region. It is conveyed from man to man, they believe, chiefly through the agency of fleas, which the habits of the people give every opportunity of passing from one man to another or from man to animals.

[It is most regrettable that these observations, of considerable importance if correct, are not supported by satisfactory evidence or adequate details. The distribution of the buboes in man, the kinds of fleas, the methods of diagnosis (of great importance in the case of animals dead some hours before examination), the species of rats are not recorded; the evidence in regard to the rat-infestation and the amount of rat-infection is not sufficient, and there are numerous points on which fuller information would be very desirable.]

J. H. S.

Sanquirico. **Note concernant la Transmission de la Peste par les Rats.**—*Rev. de Méd. et d'Hyg. Trop.* 1913. Vol. 10. No. 3. pp. 133–134.

Sanquirico during an outbreak of bubonic plague, near Dinq-Hoi in Annam, could find no evidence of a rat epizootic nor indeed could he find any rats at all. At Tomerre also in 1911 no rat infection was found. He suggests that the plague is transmitted direct from case to case by the " large fleas " of that country.

J. H. S.

Bacot (A.). **A Study of the Bionomics of the Common Rat-Fleas and Other Species Associated with Human Habitations, with Special Reference to the Influence of Temperature and Humidity at Various Periods of the Life-History of the Insect.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 447–654. With 8 plates, 12 charts and 3 text-figs.

This valuable communication embodies an immense quantity of work carefully designed and accurately carried out. It is impossible to do more than indicate the scope of the observations made and note some of the more important conclusions reached. The species chiefly studied were *C. fasciatus*, *P. irritans*, *Ct. canis*, *Leptopsylla musculi* and *X. cheopis*, and these were examined in the egg, larval, cocoon, and adult stages under varying conditions of temperature, humidity, food, etc.

In comparison with the later stages in the life-history, eggs are relatively insusceptible to external influences. Low temperature reduces the number of eggs of *C. fasciatus*, *P. irritans*, and *X. cheopis* which hatch, but 50 per cent. of eggs of the first hatched at 40·9° F., when all of the other two failed. A temperature of over 65 to 80° F., with humidity of ·70 or over is most favourable, and a temperature of over 60° with a humidity of below ·50–·55 is harmful.

The larval period falls into two stages, the active phase and that passed in the cocoon. The duration of the active period is very variable, from 15–114 days for *C. fasciatus*, 9–202 for *P. irritans*, and 12–84 for *X. cheopis*, and although low temperature favours the postponement of spinning the cocoon, there is a marked individual variation in this respect. Active larvae could survive for over a month without food under favourable external conditions. With food and a reasonable temperature a high humidity is desirable, and local moistening (*e.g.* sweat or urine of animals) may convert an impossible into a favourable site. The faeces of adult fleas are a possible diet, and perhaps in the case of *C. fasciatus* a necessary part of the food.

The cocoon period varied from eight days to over a year for *C. fasciatus*, 7–239 days for *P. irritans*, 7–182 days for *X. cheopis*, and 7–354 days for *Ct. canis*, and probably for a considerable time the flea is still in the larval stage (with *C. fasciatus* even up to 600 days). Fall in temperature appears to favour a lengthening of the cocoon stage in the case of *X. cheopis* and *P. irritans*. *Ct. canis* tends to spend the winter in the cocoon, and *C. fasciatus* frequently does so also, though some individuals are in the habit of aestivating during the hot months and emerging in autumn. Individual variation ensures the emergence of the adult fleas over a wide interval of time.

No evidence was obtained that the adult flea feeds on other than warm-blooded animals, and Bacot is of opinion that this is essential to reproduction. The amount of food taken affects the number of eggs, but not apparently the fertility of those laid. The adult lives for months when fed, *e.g. C. fasciatus* for 106 days, *X. cheopis* 100, *P. irritans* 513, *Ct. canis* 234, and even when unfed, if kept in nearly saturated air at 45–50° F., *C. fasciatus* may live for 95 days, *X. cheopis* 38 days, *Ct. canis* 58, and *P. irritans* for 125. It follows, therefore, that fleas in the complete cycle from egg to adult may survive in situations where there has been no host for very long periods, viz.,

C. fasciatus for 22 months, *P. irritans* 19 months, *X. cheopis* 10 months *Ct. canis* 18 months, and *C. gallinae* 12 months.

J. H. S.

Hirst (L. Fabian). **Identification of Rat-Fleas in Colombo.** [Memoranda.]—*British Med. Jl.* 1914. Jan. 10. p. 85.

The fleas found were identified by the Hon. N. C. Rothschild as *Xenopsylla astia*, and the fleas found in Madras, also on *M. rattus*, proved to be of the same species and not, as hitherto believed, *X. cheopis*, which it resembles very closely. The author suggests that in view of the freedom of Madras and Colombo from plague, investigation into the geographical distribution of these fleas and their infectivity as plague-porters might throw some light on the epidemiology of plague.

J. H. S.

Bacot (A. W.). **On the Survival of Bacteria in the Alimentary Canal of Fleas during Metamorphosis from Larva to Adult.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 655–681.

It was found that the alimentary canal of flea larvae may become infected with *B. pyocyaneus*, *B. enteritidis* Gaertner, *Staph. albus* and *Staph. aureus* (not with *B. violaceus*). This infection of the gut may persist till the resting period of the larva, but no satisfactory evidence was obtained that the infection lasts through the pupal stage. The conditions in the larval gut do not appear to be favourable to the growth of *B. pestis*. The plague bacillus was frequently found in the dejecta of adult infected *X. cheopis* and *C. fasciatus*, but only rarely in the larval gut, and then not in large numbers. No massive growth such as occurs in the adult flea was ever met with.

J. H. S.

Rowland (Sydney). **The Influence of Cultivation in Serum-containing Media upon the Virulence and Immunising Properties of the Plague Bacillus.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 403–411. With 1 plate.

Bacilli which have been grown on broth become notably more virulent when propagated on heated horse-serum, and a similar increase in virulence is obtained when they are grown on a synthetic medium, to which crystalline serum-albumen is added. If, however, they are grown on fresh serum (in which they multiply much less well and are subject to a considerable preliminary lysis), the virulence is markedly reduced. The antigenic properties of the organism are apparently also altered by the medium of growth. Rats immunised against broth-bacilli by a single injection of nucleoproteid from broth bacilli are much less protected against bacilli grown in serum. It is possible by injection of living virulent broth bacilli to vaccinate against serum-grown bacilli, but it is also possible to obtain an effective immunisation when the nucleoproteid used to vaccinate is prepared from bacilli grown on heated serum, and this immunity holds good against broth as well as serum bacilli. As the race of bacilli which the flea imbibes from the rat is a serum race, vaccination with broth

bacilli would appear to be a less efficient method of immunisation than vaccination with serum-bacilli. A vaccine from a serum race, however, loses in efficiency when it is prepared in the manner of HAFFKINE by heating the whole bacilli.

J. H. S.

ROWLAND (Sydney). **Influence of the Medium in which *B. pestis* is propagated upon its Virulence.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 440–446.

With the standard dose of plague used in these experiments, broth cultures are consistently more virulent than agar cultures, but the addition of a small proportion of serum-protein, or the presence of egg-white or of crystallised egg-albumen, raises the virulence very markedly higher still. Inoculation, however, of the agar, broth or heated serum culture into fresh rat-serum produces a race of lower virulence than that from which it is derived, whereas organisms taken from the spleen of a plague-rat undergo no significant reduction of virulence when propagated on fresh rat serum. Body organisms accordingly can resist, at least for a time, the depressing action of fresh serum, and it is suggested that infection of a rat follows or not according as the infecting organisms succeed or fail in breeding out a strain which can resist the depressant action of the serum. Some success has been obtained in artificially producing such resistant races by propagating on a medium containing minced spleen or spleen-juice, together with fresh rat serum.

J. H. S.

BROOKS (Ralph St. John). **The Influence of the Medium in which the Plague Bacillus is propagated upon the Facility with which it is ingested by Human Leucocytes.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 412–417.

Virulent *B. pestis* is readily taken up by human leucocytes, whether it be grown on broth agar or in heated serum from rat, man or guinea-pig. When the bacillus, however, is taken directly from the glands, or blood of a rat dead of plague, phagocytosis is greatly reduced, and this reduction, persisting for several subcultures on agar, is eventually lost again after continued cultivation on agar. A similar greatly reduced phagocytosis is obtained when the bacillus is sown from heated horse serum on fresh horse or rat-serum, and the fall in phagocytosis is shown not to be due to any action on the leucocytes of toxic substances in the mixtures.

J. H. S.

ROWLAND (Sydney). **The Morphology of the Plague Bacillus.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 418–422. With 7 plates.

Plague bacilli show an immense diversity of form, simulating micrococci, streptococci, streptothrices, moulds, &c. Grown in broth at 20° C., they possess no capsule, though under certain conditions a definite capsule may be observed, e.g. at the site of inoculation in animals. When grown at 36°, however, even in broth, a proportion

of the organisms may be seen in appropriate dark-ground illumination of an Indian ink emulsion to be surrounded by an envelope, indefinite in outline and apparently of viscid consistency. Grown in serum-containing media, the number of organisms possessing such an envelope is strikingly increased, and it is well-marked in preparations from the spleen of a rat dead of plague. The envelope is soluble in dilute alkalis, and disappears in fresh normal rat serum or immune horse serum at 37°. An excellent series of photographs illustrates the pleomorphism and the envelope under various conditions.

J. H. S.

VAN DRIEL (B. M.). **Pestbestrijding te Shanghai.** [Anti-Plague Measures in Shanghai.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 5. pp. 656-671. With 1 map.

An account of the measures adopted by the Health Department to protect the International Settlement from plague. This portion of Shanghai includes about half a million Chinese and 15,000 foreigners, and is continually exposed to infection by the juxtaposition, without dividing line, on the South-west of the Chapei district, one of the most insanitary districts of the city. The anti-plague measures are based on the dictum, which is continually kept before the native mind, that a "rat-free house is a plague-free house"; and they are organised into a constant system of vigilance. A daily search for dead rats is made, with regular examination of the corpses; rat and fly-proof receptacles for offal and rubbish are provided; a barrier of "rat-proof" houses, at least 250 feet wide, is established between the Settlement and the Chapei district, and every opportunity is taken to increase the number of "rat-proof" houses within the district. "Permanent rat-proofing" consists in the main of lifting the floors and filling all spaces with tar macadam, on which the planks are relaid directly. Double walls are forbidden, but it has proved more difficult to deal with the storing of goods under the roofs in the upper ceilings, and a compromise has had to be effected in this respect. In 1912 154,005 rats were taken alive, and 14,988 found dead (95 of the latter proved to be plague-infected). The rats were 70 per cent. *M. rattus*, and 30 per cent. *M. decumanus*, and the fleas were *X. cheopis* and *C. fasciatus*.

J. H. S.

GIOSEFFI (M.). **La Difesa contro la Peste nel Porto di Trieste ed in quello di Genova. Peste Umana e Peste Murina.** [Plague Measures at Trieste and Genoa; Plague in Man and Rats.] —*Gazz. d. Ospedali e d. Cliniche.* 1913. Dec. 4. Vol. 34. No. 145. pp. 1519–1520.

With reference to a case of plague which occurred in November 1913 amongst the workers on a ship from Buenos Ayres, Gioseffi recalls four instances of bubonic plague at Trieste since 1906, which are, like this one, attributable to the rats on ships from foreign ports. He compares the action of the Trieste port authorities unfavourably with that at Genoa, in that at Trieste the rats on ships from infected or suspected ports are examined only after plague has been communicated to man,

whereas at Genoa the rats are systematically examined at the docks and on the ships, with the object of preventing human plague from arising.

J. H. S.

Simpson (French). **Rat-Proofing a Municipal Sewer System. A Report of an Investigation to find a Practical Method of Rat-Proofing the Sewer System of San Francisco.**—*U.S. Public Health Rep.* 1913. Oct. 31. Vol. 28. No. 44. pp. 2283–2290.

City-sewers provide a permanent harbouring place for rats, and as ordinarily constructed present little obstruction to their ingress or egress. In San Francisco the rats enter or leave the sewers chiefly by the street corner-basins, which are designed to receive the flood-water from the streets, and to allow the sediment to fall out before the fluid passes on into the sewer. They are supposed to check the passage of rats by acting as a water-trap, but the water, when present, serves as a breeding place for mosquitos, and in practice the trap is usually nearly dry. The several types of catch-basin in local use are described, and a new type is recommended, the essential point of which is that the communication between the street and with the sewer shall be at least three feet in vertical height, with quite smooth walls. It was found on experiment, that the ordinary sewer rat (*M. norvegicus*) can jump two but not three feet, and this height would be sufficient to prevent egress from the sewers, though not checking ingress.

J. H. S.

Grysez (V.) & Certain (B.). **Sur la Vaccination contre la Peste par la Voie conjonctivale à l'Aide de Bacilles sensibilisés vivants.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 281–283.

Guinea-pigs were inoculated (*a*) on the conjunctiva, (*b*) subcutaneously, with graduated doses of a plague vaccine sensitised by Besredka's method. (No information is given as to the actual size of dose inoculated). The surviving animals were subsequently inoculated with 1 2000th part of an agar culture of *B. pestis*, a dose which killed controls in 3–5 days. Part of these animals were inoculated on the conjunctiva, and it was found that when the preliminary dose of vaccine was large enough, immunity to the second conjunctival dose had developed by the 16th day and persisted to at least the 52nd day; and some degree of immunity was obtained in animals receiving their first injection subcutaneously. The other animals were inoculated subcutaneously, with uncertain results. Vaccination by the conjunctiva was not found to have any practical advantage over the subcutaneous route with this vaccine.

J. H. S.

Busch. **Ueber "Ratt-Entrit."**—*Deut. Militärärzt. Zeitschr.* 1913. Dec. 20. Vol. 42. No. 24. pp. 932–935.

Ratt-entrit is a commercial preparation, which is said to kill rats and mice by destroying the mucosa of the alimentary tract after ingestion by these animals, and allowing the contained bacteria to

invade the tissues. It was found by Busch to contain an organism of the Gaertner type, and to kill mice in cages within six days.

J. H. S.

Tulloch (W. J.). **The Bacteriological Diagnosis of a Case of Plague.**—*Lancet.* 1913. Nov. 8. p. 1318.

An account of a case of glandular enlargement with subsequent fatal pneumonia, in which an organism, stated to conform to *B. pestis* on subsequent examination, was isolated from the blood and from guinea-pigs into which the blood was injected, as also from the spleen, liver and lung after death. The serum of the patient agglutinated *B. typhosus* in dilution of 1–100. Stress is laid on the value of blood-cultures in doubtful cases of plague.

J. H. S.

Bacot (A. W.). **The Effect of the Vapours of Various Insecticides upon Fleas (*Ceratophyllus fasciatus* and *Xenopsylla cheopis*) at each Stage in their Life History and upon the Bed-bug (*Cimex lectularius*) in its Larval Stage.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 665–681. With 1 text figure.

The insecticides tried were solutions of pure phenol, lysol and formalin, commercial benzine, paraffin oil, flake naphthalene and crushed camphor. For practical purposes naphthalene was found to be the most generally effective agent in all stages of the flea cycle ; it can be passed into cracks or crevices by dissolving in benzine. For rat-holes it is suggested that a soap-carbolic emulsion or soap-petroleum emulsion, to which flake naphthalene is added, should be used.

J. H .S.

UNDULANT FEVER.

Epidemiology.

Séjournant (J.). **La Fièvre Méditerranéenne en Algérie en 1912.**—*Ann. Inst. Pasteur.* 1913. Oct. Vol. 27. No. 10. pp. 828-838.

The author gives the result of an investigation made in 1912 on the prevalence of undulant fever in Algeria, and the distribution of the disease by means of animals. Following an inquiry made in 1907, which showed the disease to be very prevalent, measures were taken on the advice of Dr. Ed. Sergent to prohibit the importation of infected goats from Malta and to notify the disease. It was interesting to see after five years the result of these measures, though owing to the improved technique of Nègre and Raynaud, and the knowledge of a *para-melitensis* infection, the comparison is not quite accurate. Young cultures were employed and Sergent's technique was followed; both microscopic and macroscopic results were read off after six hours; the dilution of the milk was 1/30, of the serum 1/60. In Algiers, out of 492 goats examined, in only 20 were positive milk reactions obtained, nine with *M. melitensis*, nine with *M. para-melitensis* and two with both. Thus the percentage of infected goats was very small, and no fresh human case occurred during the year. But, in spite of the interdiction of entry of Maltese goats, a few foci of infection were found; these were traced to goats received from Spain, and the fact that an equal number of the animals was infected with the *para-melitensis* organism is of great importance. In Kléber there was a small human epidemic, nine men and two women. In one family (L) four out of five were attacked; these possessed no goats, and drank only boiled milk from a house where neither men nor goats were infected, but all the members of the family preceding them in this house had suffered from the fever, including the goat herd. The contagion was probably a local one from the stable contaminated by the milk of the infected goats.

The following interesting summary is given:—

Animals.	Total.	Examined.		Serum Agglutinated with		Total.		Observations.
				M. melitensis.	*M. para-melitensis.*			
Goats -	700	56	8 %	3	1	4	7 %	In whole village.
Horses & Mules -	?	9	—	1	3	4		In houses only of those sick during last five years.
Cattle -	?	2	—	—	1	1		
Sheep -	?	4	—	1	—	1		
Rabbits -	—	3	—	—	1	1		
Cats - -	—	2	—	—	1	1		
		76		5	7	12		

A detailed table is given of the cases, with the serum and milk reaction of these various animals. A culture obtained from the urine

of Mrs. L. (haemoculture negative) agglutinated with specific immune serum. In Sainte-Leonie, a village near to Kléber, isolated cases occurred yearly, the two last being directly traceable to Kléber.

Among the animals from the infected houses an important proportion were able to agglutinate both strains (*M. melitensis* and *M. para-melitensis*), especially horses, favouring SERGENT'S hypothesis of stable infection, but it is also possible that they may become secondarily infected from the urine of people suffering from the disease. In conclusion, it is stated that in the urban districts infection is generally from ingestion of infected milk, that in rural districts infection from stables, etc., plays an important part, not only among goats, but in other domestic animals, and that the virus may remain there a long time. People suffering or convalescent from the disease should not, therefore, be admitted into stables or dairies. Interdiction of importation of infected goats from Spain should be enforced, and serum and milk reactions should be carried out at regular intervals, and hygienic methods taught. The *M. para-melitensis* has not yet been isolated from the sick with the exception of the case studied by NÈGRE and RAYNAUD in their laboratory.

[A case of *M. para-melitensis* fever is referred to in this *Bulletin*, Vol. 1, p. 579, in which a lady contracted the fever in the South of France and though the serum agglutinated in dilution of 1/400, no culture could be obtained from the blood or urine.]

P. W. Bassett-Smith.

GOLINI (O.). **Una Epidemia di Febbre Mediterranea nella Frazione di Montepescali (prov. Grosseto).**—*Policlinco.* Sez. pratica. 1913. Nov. 2. Vol. 20. No. 44. pp. 1596-1600.

It has been shown by recent research that undulant fever is prevalent in Tuscany, and many cases have been proved to exist in Pisa, Lucia, and other places. In 1909, Professor MEMMI, director of the hospital at Grosseto, showed that many of the irregular fevers met with there, with intestinal symptoms, sweats, etc. were due to infection by the *M. melitensis*. In this region the general sanitation and hygienic conditions were bad. Probably owing to the great variety of the symptoms many more cases occurred than were diagnosed. Goats' milk was commonly used. An outbreak of the disease at Montepescali, which was of short duration, is here reported. The infection showed no sex preference, and the ages ranged from 17 to 57 years; some of the cases were very severe, others very mild of the ambulant type. With reference to the cause of the outbreak, it was found that cases occurred in the same family, the members of which slept in the same bed, ate off the same plate, drank out of the same glass, and did not take elementary hygienic measures. No evidence of infection by means of the goats was obtained, it being stated that the greater number of the infected never drank goats' milk, or if they did that it was boiled. The author concludes that infection was a place or personal one, probably through the ambulant cases. Carefully conducted sero-diagnostic reactions were carried out in each case. These he divides into three groups: (1) Severe cases with long course; (2) mild cases; (3) ambulant cases with violent neuralgia. Seven acute cases are described in great detail. In the ambulant cases the agglutination reaction ranged from 1/100 to 1/600.

[As the general hygienic conditions were so unfavourable, direct infection from the sick to the healthy is not unlikely through contaminated urine; it is also impossible to receive without doubt the assurance that all the goats' milk was boiled before being used.]

P. W. B.-S.

Della Vida (Mario Levi). **Alcune Osservazioni sopra una Epidemia di Febbre Mediterranea in un Comune della Provincia di Roma.**—*Ann. d'Igiene Sperimentale.* 1913. Vol. 23. (New Series). No. 3. pp. 263-280. With 1 map and 2 figs.

In the month of April, 1913, Dr. Sensi called attention to a small epidemic of undulant fever which had broken out at Grotte S. Stefano, in the province of Rome. The author was sent to enquire into the cause of this outbreak and how to prevent its extension. Twelve cases were quickly notified occurring close together. There were many goats, but the milk was rarely used by the people. In Grotte S. Stefano it was ascertained that late in 1911 a goat bought from a travelling vendor was introduced into the herd of goats. At the time of the enquiry 61·9 per cent. of the animals in this herd were shown to be infected. The infection slowly spread widely from this centre to other herds and then to man. From a careful enquiry, the author had no doubt that 20 cases originated from the first herd; three drank goats' milk and were thus infected, 13 cases probably contracted the disease from the infected dust, and four by direct contact from infected individuals. In the second herd at Magugnano 53 per cent. were infected; this caused a local epidemic of 11 cases all infected by the alimentary canal. The author gives very fully the epidemiological features of the epidemic and is quite convinced that a large percentage of the cases contracted the disease by other methods than drinking infected milk; the contamination of the soil by the affected goats and also by ambulant human cases, rendering, according to him, infection probable by inoculation, especially in the absence of ordinary hygienic precautions. He discusses the value of the various diagnostic tests, and draws attention to the necessity of the early recognition of sporadic cases, the introduction of State legislation for notification of cases, and the restriction of the importation of infected goats.

P. W. B.-S.

Sangiorgi (G.). **Melitococcia in Piemonte.** [Undulant Fever in Piedmont.]—*Pathologica.* 1913. Sept. 15. Vol. 5. No. 117. pp. 552-555.

The author describes a small epidemic of undulant fever at Racconigi. There were five cases, four being in the same family. In one case the *M. melitensis* was isolated from the blood, and the agglutination test was positive in dilutions of 1/200, 1/400, and 1/600 respectively, in three cases when examined with both the laboratory stock culture and with the freshly isolated organism. Inoculations into guinea-pigs were carried out, and from two of these the *M. melitensis* was recovered in pure culture. On investigation it was found that previously three other cases had occurred in which the fever had been slight. These at the time of examination were in

perfect health, all three giving positive agglutination reactions at 1/100 and 1/200. One of these, who had been ill a year and a half previously, the author considers to have been the cause of the infection, being at the time a "chronic carrier." He emphasises the importance of the work of Shaw and Missiroli in drawing attention to the frequency of these carrier cases, which are a great source of danger to the community, and he points out that hygienists must consider this source of infection as well as the use of milk of goats and cows. He also lays stress upon the value of Wright's serum test in discovering cases that are likely to be carriers of the infection.

P. W. B.–S.

Summa. **Zum Maltafieber in Südwestafrika.** -*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 838-840.

Cases of undulant fever have during the last few years been frequently diagnosed in German South-West Africa by agglutination methods; the author describes a case in which the *M. melitensis* was isolated from the blood, definitely confirming the serum test. The case was that of a doctor who suffered from vague rheumatic pains and intestinal symptoms for a year. Treatment for these was not successful, and he was admitted to hospital. His serum gave a positive agglutination in dilution of 1/160, and from 5 cc. of blood the micrococcus was isolated. Clinically there was no enlargement of liver and spleen, or continued pyrexia, but articular pains were marked. The patient drank unboiled milk freely, but had also been working with cultures of *M. melitensis* in the laboratory, so that the exact mode of infection is doubtful. It is stated that cases of this fever can no longer be looked upon as rare in South-West Africa, and that many are mistaken for malaria. Collargol given as a germicide in 0·15 gm. doses intravenously will cut short the fever in some cases, but has produced violent toxic nephritis with suppression of urine. Pyramidon in small frequent doses is stated to have favourably influenced the course of the disease in a child aged eight months [no details are given.]

P. W. B.–S.

Wellman (C.), Eustis (A.), & Schochet (S. S.). **Malta Fever in Louisiana. Report of a Positive Case in a Series of Forty-Six Agglutination Tests with** *Microbacillus melitensis.*—*American Jl. of Trop. Dis. & Prev. Med.* 1913. Nov. Vol. 1. No. 5. pp. 393-396. With 1 chart.

The case of a man aged 50, who contracted undulant fever in Jackson County, Texas, is described. The patient had previously suffered from malaria and amoebic dysentery. The attack commenced in March 1913. There was prolonged irregular fever, with sweats and enlargement of the spleen and, towards the end, acute arthritis of the left elbow. The blood picture showed a marked polymorphonuclear leucocytosis on the admission to hospital in New Orleans in June, but no sign of sepsis could be detected nor evidence of dysentery. His serum agglutinated at 1/40 in 30 minutes with a culture supplied by Bassett-Smith (strain G.), and in July a pure culture of the *M. melitensis* was obtained from the blood. The case died from broncho-

pneumonia in August. It is reported as being the first definitely diagnosed in Lousiana.

[Polymorphonuclear leucocytosis has not before been noted in uncomplicated cases of undulant fever. The term *Microbacillus melitensis* is used ; this alteration in the designation of the micrococcus is neither warranted nor desirable.]

P. W. B.–S.

Leger (Marcel), & Dominici-Urbani (Ch.). **Documents relatifs à l'Extension de la Mélitococcie en Corse.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 673-678.

An enquiry into the origin and distribution of undulant fever in Corsica has been carefully carried out by the authors, who obtained much written, verbal, and ocular evidence of the disease. They found that undulant fever is no longer limited to a small centre in the north, but is now widely distributed throughout the island. The infection was probably imported by infected goats from Malta to the north of the island, where cases are still most numerous ; by the periodic migration of the goats during the summer into the central part the herds mix and the infection spreads. The earliest reported cases in man were noted in 1892, in the form of an epidemic the true nature of which was not recognised at the time. Measures similar to those that have been so successful in Algeria and Tunis are required to be put in force as soon as possible, so as to eradicate the disease from both goats and man.

P. W. B.–S.

Agglutination and Serum Reactions.

Kennedy (J. C.). **Preliminary Note on the Presence of Agglutinins for the *Micrococcus melitensis* in the Milk and Blood-Serum of Cows in London.**—*Jl. R. Army Med. Corps.* 1914. Jan. Vol. 22. No. 1. pp. 9-14. With 1 illustration.

In testing in London some samples of goats' milk a control of cows' milk was used. To the surprise of the author this gave a complete positive reaction in a 1/20 dilution with the *M. melitensis*. Milk from the same source was tested on eleven different occasions, giving positive results in nine. Twelve other samples from mixed milks obtained in London gave complete reactions in four. Samples of milk taken direct from cows were then tested ; one reacted up to 1/300, and the milk of nine gave incomplete reaction in 1/20 dilutions. From a second dairy with 13 cows two gave very marked reactions. The blood serum of two of the cows giving high lacto-reactions was also found to react positively in dilutions of 1/200 and 1/250. An attempt was made to isolate the *M. melitensis* from the milk by plating ; this was unsuccessful. The strain of *M. melitensis* showed no sign of auto-agglutination, and did not react to normal serum in higher dilutions than 1 10. The technique employed was as follows :—A strong emulsion was made in saline solution from a 3–4 day old culture on agar. The milk, to which a trace of formalin had been added, was diluted with saline solution. One part of the diluted milk was mixed with an equal part of the emulsion and was then put up in sedimentation tubes at room

temperature, and the result read off after 20 hours. No definite observations were made as to the effect of heating the milk to cut out non-specific agglutinins, but using whey instead of the whole milk did not alter the reactions; therefore agglutination of the oil globules, which sometimes takes place, was not the cause of the reaction. The reaction was not dependant on the acidity of the milk, and it was not due to preservatives added. Filtration of the milk through Berkefeld or Doulton candles reduced or prevented the reaction; it appeared that the agglutinins were held back by the filter.

Summary.—" 1. Agglutination of the *Micrococus melitensis* is produced by high dilutions of both milk and the serum of certain cows in London.

" 2. Of thirteen samples of ' mixed ' milk from thirteen different dairies in London, five gave a positive reaction, one an incomplete, and seven a negative.

" 3. The milk of three out of twenty-two cows gave a complete positive reaction, that of one was indefinite, and the remainder were completely negative.

" 4. The serum of two (the only ones tested) of the three cows whose milk gave a positive reaction also had a high agglutinative value for the *M. melitensis.*

" 5. The *M. melitensis* has not been isolated from the milk on the few occasions on which it has been plated out."

The author does not wish it to be considered that the milk is necessarily capable of transmitting undulant fever, but that the agglutination reaction of the milk may have some other explanation than that the cows were infected with the *M. melitensis.* He was unable to complete his research as he was immediately proceeding to India.

[This most interesting piece of work bears out the observations of Martel, Tanon and Chrètien, who state that the lacto-reaction is unreliable for diagnosis. It is highly probable that these anomalous results are not due to any want in the specificity of the reaction, but to some error of technique. The fact that positive serum reactions were obtained in two of the cows examined make it more difficult to explain; the high agglutinations which are found in several animals can be cut out by heating. Several workers lately have recommended for use cultures not more than 48 hours old; those used were of 3–4 days' growth—when possibly agglutination is more easily brought about. That the cows are really infected with the micrococcus is unlikely, as the positive reactions were so frequent, and human infections from the London milks are practically unknown, which would certainly not have been the case if the infecting organism had been present.]

P. W. B.–S.

Martel, Tanon & Chrètien. **La Valeur de l'Agglutination du *Micrococcus Melitensis* par le Sérum Sanguin en particulier chez les Chèvres.**—*Presse Méd.* 1913. Aug. 20. No. 68. pp. 685-686.

The authors believe that the agglutination test for proving a *M. melitensis* infection in man is uncertain and sometimes misleading, even when heated serum is used; they also consider that the same errors are more likely to occur in the case of goats. Of agglutinations obtained with serum, urine, and milk, they hold that the serum is the only one to employ, and as this gives errors, much more so will the urine which is rich in salts, extractives, mucus, and albumen which when in

contact with the specific organisms may cause them to mass together. Milk is much too rich in albuminoid matter and globules of fat for it to give correct results; it is also extremely variable in its composition from day to day. They experimented on three goats; before any injections were given, the serum of each animal was tested for agglutinins with the following results :—

	No. 1.	No. 2.	No. 3.	Dilution.
M. melitensis ..	Nil	Nil	Nil	.. 1/30 to 1/50
Streptococcus ..	Nil	Nil	Nil	.. 1/30
B. typhosus ..	Aggl.	Nil	Nil	.. 1/30 to 1/50
B. cholera ..	Nil	Aggl.	Nil	.. 1/30
B. mallei ..	Nil	Nil	Nil	.. 1/30
B. coli com. ..	Aggl.	Aggl.	Nil	.. 1/30

The first goat was injected with *B. typhosus* and produced agglutinins for *B. typhosus*, *B. coli* and *M. melitensis*, but the agglutinins were destroyed by heating the serum to 57° C. for half an hour. The second goat was injected three times with cultures of *S. albus*, which provoked the formation of agglutinins for *M. melitensis* up to a dilution of 1/100; this disappeared on heating the serum. To the food of the third goat was added cultures of *Staphylococcus albus*; the animal died on the eighth day, but the serum before death showed agglutination for *M. melitensis* and *B. coli*; this also was destroyed by heating the serum. This experiment led them to believe that in naturally infected goats modifications of the agglutinins may be caused by intestinal infections. Experiments with guinea-pigs showed that other organisms gave rise to agglutination of the *M. melitensis*, up to 1/100 dilutions of the serum, but with these animals heating did not cause the disappearance of the antibody. From previous work and the results of these experiments they have drawn up the following conclusions :—

(1). Typhoid infection experimentally produced causes the formation of active agglutination for the *M. melitensis*. The serum of infected goats is active up to dilutions of 1/50, but the non-specific agglutinins disappear after heating the serum for half an hour at 57° C.

(2). Experimental staphylococcic infection determined the active production of agglutinins for *M. melitensis*. The goat's serum agglutinates feebly when the infection is slight.

(3). The agglutination of the *M. melitensis* by the serum of goats up to 1–50 does not prove that the goat is infected with the micrococcus.

(4). Heating the serum as recommended by Nègre and Raynaud does not prevent all chances of error.

(5). For the diagnosis of undulant fever in goats it is indispensable to carry the agglutination up to 1/100; for the diagnosis in man they recommend the use of dilutions from 1/50 to 1/150, and the serum should always be heated for half an hour to 57° C.

(6). Blood culture makes a certain diagnosis.

(7). It is wise in all cases of agglutination, as a general prophylactic measure, to condemn the use of raw milk and cheese made with milk of the suspected goats.

P. W. B.–S.

Natale Salvatore. **Sul Valore da assegnarsi alla Siero-diagnosi nella Febbre Mediterranea.** [Upon the Value to be assigned to Sero-diagnosis in Undulant Fever.]—*Policlinico.* Sez. practica. 1913. Dec. 21. No. 51. Vol. 20. pp. 1852-1856.

After some preliminary observations the author points out the great

variation in the amount of agglutination observed in some cases from day to day, the importance of using cultures that do not show any tendency to auto-agglutination, and the avoidance of strains of *M. paramelitensis* which, as shown by Nicolle and Conor, give negative reactions in true cases of undulant fever. The results of 80 cases tested during 1912, at the Pathological Institute in Palermo, are given. A 24 hour growth of a strain of *M. melitensis* was used for the emulsion, which did not give any auto-agglutination, the reactions being controlled by normal sera and sera of immunised animals injected with Trambusti's nucleo-proteid. The microscopical method was used with observations of from half an hour to six hours. The cases were divided into groups (given in a table). Those that gave positive reactions with (1) *M. melitensis*, (2) *B. typhosus*, (3) *B. paratyphosus*, (4) *B. coli;* and (5) 36 that gave no definite reactions with either.

1*st Group*: Fifteen cases agglutinating with *M. melitensis* from 1/60 to 1/500; some of these gave reactions with *B. typhosus, paratyphosus* and *coli*, but not in higher dilutions than 1/20.

2*nd Group*: Ten cases agglutinating positively with *B. typhosus* from 1/100 to 1/500; serum reactions were obtained for *M. melitensis* up to 1/15. Controls of normal serum agglutinated the same up to 1/25 and the immunised serum up to 1/5,000.

3*rd Group*: Eight cases agglutinating *B. para-typhosus* to from 1/80 to 1/1,000. None reacted with *M. melitensis* in higher dilutions than 1/20. Normal sera agglutinated the latter to 1/25 and the immunised sera from 1/1,000 to 1/5,000.

4*th Group*: Eleven cases agglutinating *B. coli* from 1/25 to 1/120. None reacted with *M. melitensis* in higher dilutions than 1–20.

5*th Group*: Thirty-six cases gave no agglutination with *M. melitensis* above 1/20.

From these observations he concludes that a 1/40 dilution of the serum can be used with safety for diagnosis for undulant fever, but it is better to carry it much higher.

P. W. B.–S.

Miscellaneous.

Bartet & Defressine. **Un Cas Mortel de Fièvre Ondulante observé à Ajaccio (Corse).**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 601-605.

The case described is of considerable interest. A man aged 45 years contracted undulant fever in December 1912, apparently by drinking milk from infected goats in the vicinity of Ajaccio. He complained early of night sweats, epigastric discomfort and articular pains. The correct diagnosis was not made until June, 1913, when a sample of his blood sent to Toulon gave definite agglutination up to 1/100 with *M. melitensis*, with both heated and un-heated serum. At that time no abnormality was found physically in heart, lungs, spleen and liver, but the febrile and other symptoms persisted. Preceding his death in August, probably from a failing heart, due to the prolonged fever, enlargement of the liver and oedema were very marked. At the post-mortem the Micrococcus was demonstrated in the liver and spleen. In this case the marked dyspeptic symptoms at first caused an error

in the diagnosis, and the authors point out that since the disease has become better recognised in Corsica the mortality is estimated as from 6–10 per cent., instead of the 2–3 per cent. usually given. Infection is not always due to drinking unboiled milk, but sometimes occurs from eating infected cheese and from direct inoculation of the hands by the milk containing the living micrococcus.

P. W. B.–S.

Cazeneuve (H.). **Ostéo-périostite post-mélitococcique.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 668-672.

The clinical notes are given of an officer aged 27 who contracted undulant fever in Morocco. The following year painful periosteal swellings appeared over the lower end of the left femur and upper part of the right tibia. The patient finally returned to duty 20 months after the onset of the fever. [Similar cases during convalescence from undulant fever have been described by Cantaloube and others, and are mentioned in text books.]

P. W. B.–S.

Marshall (C. H.). **Experiments with the *Micrococcus melitensis*.**—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Part 3, pp. 220-223.

The author gives the results of some animal inoculation experiments made by himself with the *M. melitensis*. He obtained five strains from Eyre: (1) and (5) from Malta milk, (2) and (4) Bassett-Smith, and (3) from a fatal case (Richards). Of the five strains only No. (4) proved of a high degree of virulence, killing a guinea-pig after intra-cerebral injection in 24 hours, guinea-pigs with (1), (2) and (3) living seven, five, and five days respectively. The virulence of No. (3) was raised by passage and these two, (3) and (4), were used for the experiments. Examinations made during the periods of observation showed that infection of the urinary tract is invariably of late appearance, as in none of the animals could the organism be demonstrated from the bladder or urine. [The kidneys do not appear to have been examined.] The effect of "606" upon the *M. melitensis* in the infected animals was tested. A few minutes after the injection of the virulent culture a dose of "606" was given subcutaneously or into a vein. Two guinea-pigs and ten rabbits were treated. The experiments demonstrated (1) that the slightly increased virulence obtained by a few passages of the *M. melitensis* through guinea-pigs did not increase the virulence of the strain for rabbits; (2) That "606" appeared to have a definite inhibitory effect on the *M. melitensis* when injected into the experimental animal shortly after the inoculation of the organism; (3) That when the dose of "606" was insufficient to prevent infection a subsequent dose appeared to have had a definite curative effect.

P. W. B.–S.

Treatment.

Hitchens (A. Parker). **Serums and Vaccines in the Prevention and Treatment of Undulant Fever.**—*American Jl. of Trop. Dis. & Prevent. Med.* 1913. Sept. Vol. 1. No. 3. p.p. 228-245.

This interesting paper gives a very complete resumé of the work that

has been done on the subject since WRIGHT'S observations in 1895. The author points out that the disease is now definitely recognised as being present in Texas, and believes that it is much more widely spread in America. No new facts are brought forward, but in his conclusions the author states that the accumulated experiences of the past decade in the use of bacterial vaccines in general prove that, properly used, suspensions of killed micrococci have marked value, and possibly there may be an advantage in the use of sensitized vaccines for the treatment of persons of low vitality, or at a toxic period of the disease. [This has not yet been tried in undulant fever.] Anti-melitensis serums had practically been abandoned until the introduction of Trambusti-Donzello's serum, which is stated to have given satisfactory results when used early in the cases. A bibliography is given at the end of the paper.

P. W. B.–S.

IZAR (Guido). **Sulla Chemoterapia del l'Infezione Melitense.**—*Pathologica.* 1913. Nov. 15. Vol. 5. No. 121. pp. 672-676.

After a preliminary discussion of chemotherapy the author states that melitensis infections should be very amenable to chemical agencies. He therefore carried out some experiments in vitro and in vivo. Ethyl copper chloride, Isopropyl copper chloride, and Isoamyl copper chloride were used, successive dilutions of the salts were made and these were then mixed with a seven days broth culture of *M. melitensis*. The former salt was the most powerful, killing the micro-organism in dilution of 1/128,000; this was, therefore, used for the experiments. Tests as to effect of time and temperature were made and also the action of the salt on cholera and coliform organisms. For further experiments, white rats and mice were used; these were infected intraperitoneally with the micro-organism, and the salt was given subcutaneously in a 2 per cent. solution in oil. In the first series, both with a single dose and with four repeated doses, the animals remained well after 240 hours, the controls dying in 72–84 hours. Similar results were obtained when both the dose of the infecting organism and the salt were increased. A third series showed that the treatment was effective when the salt was given as long as 60 hours after the infection, but after 72 hours the animals died in the same time as the controls. [These results confirm the work of SCORDO (this *Bulletin*, Vol. 1, p. 578), which showed that chemical agents injected into the blood of animals do frequently destroy the rather sensitive micro-organism of undulant fever. It is unfortunate that the author uses the formula of M.Br. for *Micrococcus melitensis* of BRUCE, as NICOLLE introduced the formula M.M.Br. for the strain now known as *M. para-melitensis*.]

P. W. B.–S.

THE WHITE RACE & THE TROPICS.

i. Price (G. Basil). **Discussion on the Causes of Invaliding from the Tropics.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1290-1293.

ii. Simpson (R. J. S.). *Ibid.* pp. 1293-1294.

iii. Law (William F.). *Ibid.* pp. 1294-1296.

i. The author starts his paper by saying that considerable variation may be expected to occur amongst those resident in tropical and sub-tropical regions, both in the different countries concerned and amongst the different classes of European residents. Some factors relating to health and disease are fairly constant, such being average temperature, thermic influence, the humidity of the atmosphere, elevation, different diseases and insanitary conditions. Others again vary greatly, for example, the location of the individual, his habits, and idiosyncrasy. The figures from which the author's statistics were derived refer to missionaries, 1,479 lives being dealt with, of which 1,051 were obtained from the Church Missionary Society.

India.—The following table gives the different causes of invaliding taken from 203 cases living in India :—

	Per cent.	
Nervous conditions of a neurasthenic type ..	20·6	25·4
Mental disorder of acute type	4·8	
Enteric fever	16·6	
Malaria	13·3	
Dysentery	6·4	
General debility	4·8	
Pulmonary tuberculosis	3·2	
Cardiac disease	3·2	
Anaemia	3·2	
Small-pox	1·6	
Gall stones	1·2	
Eye conditions	1·2	
Blackwater fever	0·8	

China.—In this country the missionary lives numbered 394 (162 men and 232 women) and supplied 203 cases of invaliding.

Causes.	North (58 cases)	Central & West (79 cases)	South (66 cases)	Total (203 cases)
	Per cent.	Per cent.	Per cent.	Per cent.
Neurasthenia	44·8	17·7	16·6	25·0
Insanity	5·1	12·6	7·5	8·8
Enteric and para-typhoid ..	13·8	7·6	7·5	9·8
Malaria	8·6	11·4	15·0	11·8
Dysentery	5·1	7·6	3·0	5·9
Tubercle, pulmonary ..	5·1	8·8	18·0	10·8
Typhus	—	5·0	—	1·9
Sprue	—	2·5	4.5	2·9
Small-pox	—	3·8	—	1·4
Anaemia	—	—	3.0	0·9

Africa.—134 persons were invalided from different parts of Africa, the following being the diseases responsible :—

Causes.	North (39 cases)	West (12 cases)	Central (52 cases)	South (31 cases)	Total (134 cases)
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Neurasthenia ..	23·0	8·3	21·1	22·5	20·8
Malaria	10·0	75·0	19·2	9·6	19·4 } 29·1
Blackwater fever ..	2·5	—	21·2	3·2	9·7 }
Enteric	18·0	—	—	12·9	8·2
Dysentery	10·0	—	1·9	—	3·7
Small-pox	2·5	—	1·9	—	1·5
Cholera	2·5	—	—	—	0·7
Undulant fever ..	2·5	—	—	—	0·7
Anaemia	—	8·3	9·6	—	4·4
Pulmonary tuberculosis	—	—	—	12·9	3·0
Old Age	—	—	—	25·8	6·0
Typhus	—	—	—	3·2	0·7
Tick fever	—	—	1·9	—	0·7
Sleeping Sickness ..	—	—	1·9	—	0·7
Mania	—	—	3·8	—	1·5
Heart Disease ..	—	—	—	6·4	1·5

From his work the author reaches the following conclusions :—

"1. That a missionary's work involves great risks to health.

"2. That capacity for 'nerve strain' is a real factor to be considered in passing candidates to go abroad, and therefore it would be wise to exclude those who have any decided taint of mental instability in their family history, also those of highly nervous temperaments. The impulsive, enthusiastic, but easily depressed person will not stand the strain of the conditions inseparable from a tropical life and work, unless they have also a leaven of common-sense, humour, and good self-control. Isolation, overwork, under-staffing of stations, the heavy incidence of minor illness which does not immediately necessitate invaliding, the possible experience of scenes of violence and alarm (especially during recent years in China), will try the most placid or callous temperament, and largely accounts for the heavy incidence of this class of disease—that is, 20 to 80 per cent. of invaliding.

"3. The prominence of a large class of infectious diseases calls for note, since an average of 42 per cent. of invaliding is due to them. Against this latter class many safeguards can be taken ; small-pox should never occur if revaccinations were enforced. Enteric fever should be greatly diminished with wider and more frequent recourse to inoculation and extended knowledge as to methods of infection amongst the laity.

"Malaria and blackwater fever can be more nearly controlled if more persistent efforts were made to efficiently teach all who go abroad the facts so universally acknowledged as to malarial prevention. Referring to the section I represent, many societies do not even yet see the necessity for any systematic instruction on health and hygiene for their missionaries, whilst they insist on a too long course (as it seems to the writer) in theological studies, if health and life have to be sacrificed for it.

"4. The frequent appearance of pulmonary tubercle—due generally to infection abroad—points to the necessity for eliminating by medical examination all those who may from their family or personal history have shown predisposition to the disease.

"5. Most of the lives considered in the above statistics are select lives, the examinations by many of the societies being as strict as for a large insurance policy, but the need for such medical criticism and elimination of the unfit still needs emphasizing to certain other societies and associations."

ii. The materials used for Colonel Simpson's paper were taken from the Army Medical Reports from 1886 to 1895, 1896 to 1905, and 1906 to 1910. The numbers invalided per 1,000 of strength over each of these periods have been compared. In India between 1907 and 1911, both inclusive, the following were the actual numbers of cases invalided permanently for tropical disease :—

Enteric fever	21
Kala Azar	3
Beriberi	4
Malaria	18
Dysentery	1

or a total of 47 cases in five years on an average strength of about 72,000 men.

Among non-tropical diseases nervous and mental diseases predominate, epilepsy, melancholia and delusional insanity being common. The author concludes :—

"(1) That Tropical diseases of themselves produce only a relatively large temporary invaliding.

"(2) The temporary invaliding from a station for causes other than tropical disease, taken generally, rises and falls over the whole of our foreign stations with the invaliding for tropical disease.

"(3) The important causes of invaliding, temporary and final, are in order of importance :—

Nervous and mental diseases.
Tuberculous disease.
Diseases of the special senses, including the eye.
Diseases of the heart, functional and organic.

"(4) These are the same causes which are effective in Great Britain and almost in the same order."

iii. The observations set forth in this paper were based upon the work done in British Guiana, which was confined to no particular class but included Government officials, employees on sugar plantations and business men and their families. The author believes that, even if all tropical diseases were eliminated, climate would still remain a powerful enemy to the settlement of the European in tropical countries. Apart from climate, by far the most fertile source of invaliding in British Guiana is malaria, which accounts for nearly three-quarters of the temporary invaliding, and is an important element in bringing about permanent disability. Nervous disease, as the most frequent cause of prolonged and permanent invaliding, comes next to malaria. Of these, functional derangements, varying from mere nervous irritability or slight mental depression to acute melancholia with suicidal tendency, are common. Heavy work of a responsible nature is not easily borne in the trying conditions of tropical life and this frequently leads to the so-called nervous breakdown.

Epitomizing his conclusions the author states :—

"It would appear that permanent invaliding is most frequently demanded in cases of nervous disease, heart affections, and obstinate anaemias ; whereas temporary invaliding, if of sufficient duration, will as a rule, set right an otherwise healthy person suffering from malaria, enteric fever, dysentery, or other acute disease."

Other speakers who joined in the discussion also laid stress upon the frequency of neurasthenia in Europeans living in the Tropics. [The frequency of this amongst missionaries is well brought out by Dr. Price's tables.]

G. C. Low.

CHARLES (Havelock R.). **Neurasthenia and its bearing on the Decay of Northern Peoples in India.**—*Trans. of the Soc. Trop. Med. & Hyg.* 1913. Nov. Vol. 7. No. 1. pp. 1-31.

The author states that an abnormal bodily state is produced by the light, humidity and heat of the Tropics—a change in body temperature, a lowered pulse rate and tension, an irritable heart, a lessened respiratory function, owing to deficiency of intake and rarefaction of the air, and deterioration of the blood. An increasing perspiration causes a lessening of the kidney excretion and with the extra work thrown on the liver there follows a continued congestion, then degeneration. Thus the climatic conditions lower the powers of resistence and render the individual more liable to fall a victim to the attacks of the specific forms of disease.

Light coloured persons are perfectly fitted to cold climates, but when they migrate to hot latitudes they are damaged by the conditions to which they are exposed. This, the author states, accounts for the fact that though there has been a succession of streams of white races flowing south into India, these people have not permanently survived there as such. Those that have remained have become absorbed and have taken on the characteristics of the country. Many others have disappeared and are forgotten. For a white race to preserve its purity and predominence in a tropical climate and to keep that vigour, intelligence, and physique which are its characteristics, fresh waves of immigration are essential to make up for the wear and tear due to climatic influences. To those who say that white races can permanently colonize the tropics the author brings forward the history of the various multitudes of invaders of India, their utter disappearance or their absolute changes, both bodily and mental.

In the discussion which followed the reading of the paper BALFOUR quoted some suggestions from ANDERSON'S "White Man in the Tropics," and as these are important and sum up the subject in a nutshell they may be given here :—

"1. When a species is well adapted to the conditions which environ it, it flourishes ; when imperfectly adapted, it decays ; when ill adapted, it becomes extinct.

"2. When a white man, native of a temperate zone, goes to the tropics, there occurs a histological reaction of his system to the new environment, and readjustments of co-ordination between his vital processes.

"3. In the tropics the white man, individually, can exist ; racially, he cannot persist.

"4. Acclimatisation is not possible.....

"No colony of northern origin has ever been able to lead a permanent and independent existence in the tropics."

[From the remarks of other speakers, as well as those quoted above, it is readily seen that nervous disorders, usually spoken of as neurasthenia, are the chief causes of the degeneration of the white man in the tropics. See also papers above by PRICE, SIMPSON and LAW. How far this condition is a result of previous tropical illnesses, such as malaria, dysentery, etc., is not pointed out, but clearly this is important and requires careful consideration.]

G. C. L.

Guiteras (Juan). **The White Race and the Tropics.**—*Amer. Jl. Trop. Dis. & Preventive Med.*—1913. Aug. Vol. 1. No. 2. pp. 152-168.

Arguments are presented in support of the view that the tropical climate is compatible with the best manifestations of human activity and that the acclimatisation of the white race has, in the Tropics, been successfully accomplished. The author believes that many of the failures of the white races successfully to acclimatise in the Tropics have been chiefly due to diseases such as ankylostomiasis, malaria, etc. A table of vital statistics of Cuba is given, and the author argues that the results contained therein do not represent the death rate of a dying population, but rather of one that is very much alive. The general death rate reaches a very low figure, and one that compares favourably with those of the best organised countries in other latitudes. It is noted that as regards modes of living the Spaniard and Englishman have markedly differed, though those differences are perhaps not as striking to-day as formerly. The Spanish conquerors, according to the author, displayed in the Tropical countries of America, often in the low and hot lands, a degree of energy which they never equalled in their European struggles and achievements. Physiologists and hygienists have not been able to point out any alteration in the metabolic processes of the human body in the Tropics, adaptations of the heat-eliminating functions of the skin having alone been observed.

Guiteras believes, however, that proper motives and proper channels of energy are generally lacking or misdirected at the present time in the white communities of the Tropics, though those communities are now beginning to conquer the diseases that have contributed to place them, for the time being, on a scale of relative inferiority.

G. C. L.

Chamberlain (W. P.). **Some Features of the Physiologic Activity of Americans in the Philippines.**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. July. Vol. 1. No. 1. pp. 12-29.

The influence of warm climates on Caucasians from temperate zones, who take up their residence for longer or shorter periods in the tropics, is a matter of great and increasing importance. In the past the effects of climate *per se* have been largely masked by the results of varying tropical diseases, but now that these can be largely prevented the former condition may be studied in a pure state. Chamberlain has done this, selecting for his purpose the men in the military forces of the United States who have served in the Philippines during the last few years—these men of course are specially selected, being perfectly healthy when they go to the tropics and, when there, given every hygienic protection. He summarises his conclusions as follows :—

1. Healthy American males, averaging about 25 years of age, after 19 months' residence in the Philippines, show :—

(*a*) An average body temperature by mouth of 98·7° F.

(*b*) An average pulse rate of 77·3 beats per minute.

(*c*) An average respiration rate of 19·3 per minute.

(*d*) An average systolic blood-pressure of 115·6 millimeters.

(*e*) An average loss of weight during one year of two pounds, or 1·3 per cent.

(*f*) No greater per cent. of loss for large men than for small men.
(*g*) An average erythrocyte count of 5,200,000 per cubic millimeter.
(*h*) An average haemoglobin reading of 89·6 per cent.
(*i*) An average leucocyte count of 7,304 per cubic millimeter.
(*j*) An average polymorphonuclear count of 56·8 per cent. with small lymphocytes 31·7 per cent. and large lymphocytes 6·9 per cent.
(*k*) A very slight shift to the left in the Arneth picture.
(*l*) An average specific gravity of urine of 1019·8.
(*m*) No appreciable effect on items (*a*) to (*i*) as a result of complexion, type or season.
(*n*) A very slight increase in temperature and respiration rate, a moderate increase in pulse rate, and a considerable elevation of blood-pressure as a result of moderate exercise.

2. There is no material difference in the admission rates for insanity and nervous diseases, and in the ratio of suicides, for troops serving in the Philippines and for those stationed in the United States.

3. Among 1,208 men residing in the Philippines :
(*a*) Seventeen per cent. complain of some loss of memory.
(*b*) Six per cent. complain of insomnia.
(*c*) Twenty-five per cent. complain of depression.
(*d*) Six per cent. complain of irritability.
(*e*) Six per cent. complain of anorexia.
(*f*) Eighty-seven per cent. eat as much as at home, three per cent. more and ten per cent. less.

Since all men were doing full duty, it is probable that the sensations complained of were of slight degree and perhaps in many cases fanciful.

4. It seems probable that climate *per se* exercises little if any harmful influence on Americans in the Philippines.

5. By far the larger part of the morbidity and mortality in the Philippines is due to nostalgia, isolation, tedium, venereal disease, alcoholic excess, and especially to infections with various parasites.

6. The facts justify the hope that the progress of tropical sanitation may ultimately permit the permanent colonization of certain parts of the tropics.

[Loss of memory, insomnia, depression, anorexia, irritability, etc. must be put down to the climate *per se* i.e., to its harmful effects, and it is just these causes that render a very prolonged life in the tropics an impossible one for many Europeans.]

G. C. L.

MISCELLANEOUS.

Külz (L.). **Beiträge zur Pathologie Kameruns.** [Contributions to the Pathology of Kamerun.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 830-834. With 2 text figs.

Several peculiar pathological conditions are described. The first condition, [though the author does not suggest this,] is evidently ulcerating granuloma of the pudenda; from the photograph in the text it would seem to be a typical case.

The second, again illustrated by a photograph, shows a mycotic condition of the skin, microscopic specimens showing a network of fine mycelial threads. [Could it be pinta ?]

Thirdly a case of *Hautmaulwurf* [Creeping disease] is described, fourthly another peculiar dermatitis, fifthly cases of non-leishmanial tropical splenomegaly—so called pseudo-kala azar [such cases have been described from the Philippine Islands and from Egypt, while the reviewer has seen similar ones from the West Coast of Africa], and lastly a febrile condition with recurrences with no spirochaetes present in the blood during the remissions.

G. C. L.

JAMAICA. **Six-Monthly Report on the Work of the Governmen Bacteriologist, March to September, 1913.** [SCOTT, H. H. —Received in Colonial Office, Nov. 6, 1913.

Ankylostomiasis.—During the year ending March 1913, over 800 specimens of faeces were examined from various districts of the island and 78·2 per cent. were found to contain ankylostome ova. In addition Trichuris and Ascaris ova were found. The following method for examining faeces was adopted: A portion of the faeces was well shaken up with water in a specimen tube (unless the stool was fluid), the resultant emulsion was then centrifuged and slides of the deposit put up, a cover-glass was applied and the specimen examined. If the result was negative, a second and third slide were examined. It was not possible to look at more than three, for on some days as many as 50 specimens or more had to be examined in addition to other work. If the calcium chloride method had been employed, it is possible that a slightly higher percentage of positive findings would have resulted.

The author believes that invasion by these parasites is responsible for the natural dullness, indolence and "ergophobia" of the native. Many of these suffering with indefinite symptoms such as fatigue on mild exertion, slight fever, want of concentration, and general hebetude, were found to be harbouring ankylostomes.

Dysentery.—During the period under review there has been more dysentery than usual in the Island. The disease has not been limited to any particular district and though many cases have occurred there has been no actual epidemic. Amoebic, bacillary, lamblial and balantidial forms have been met with in the order given. The opinion was formerly held that amoebic dysentery was not seen in Jamaicans, the main reason for this statement being that liver abscess is very rare there. The author points out that this condition is probably not so uncommon as is generally believed.

Three cases of blackwater fever came under notice, but nothing peculiar was found in the blood.

[The statement that a case of filariasis has never been seen in a Jamaican unless he has been abroad requires confirmation. A more extended and accurate examination of cases would probably show that the disease does exist there though it may not be as abundant as in Barbados and the other West Indian Islands.]

G. C. L.

CHAGAS (C.). **Notas sobra a Epidemiologia do Amazonas.** [Notes on the Epidemiology of the Amazons.]—*Brazil Medico.* 1913. Nov. 8. Vol. 27. No. 42. pp. 450-456.

In this paper the author gives a very comprehensive account of the diseases met with in the Amazon basin, during a professional tour made in that region on behalf of the Oswaldo Cruz Institute.

The Amazon basin is chiefly given up to the collecting of rubber, and the health of the rubber-collecting population is a matter of immense commercial importance to Brazil at the present time, in view of the competition of other rubber producing localities. The author was sent to report upon this subject.

The mortality from malaria in the valley of the Amazon is enormous.

The case is given of a small town named San Felippe on the Rio Juruá, in which out of a population of about 900 inhabitants 400 died of malaria alone in the first six months of 1911, according to official statistics. The general neglect of the use of quinine as a prophylactic in these regions is remarkable. In the municipal pharmacy of San Felippe was found only one small bottle of quinine, containing 20 grammes, thrown into a corner along with other unused drugs. This prejudice is traceable to the fact that, in former times when quinine was dear, the rubber-stations along the rivers were visited by itinerant medical practitioners who came by boat and vended the drug at a high price in totally inadequate doses. As the author points out, such a use of quinine makes the parasites more resistant and so the remedy is discredited. The malaria of the Amazon basin seems to be due to three types of parasite, of which the benign and the pernicious tertian are by far the most frequent. The quartan form was only met with on the Rio Acre, where it causes a type of disease remarkable for the early supervention of oedema of the ankles and of the body generally. As the parasites are found to be very plentiful in the blood of this type of ague, the dropsy would seem to be due to the destruction of blood corpuscles. This form of oedema often gives rise to the diagnosis of beriberi, generally supposed to be a common disease on the Amazon. The author however thinks that such a diagnosis is generally erroneous, and the same may be said of malarial polyneuritis, of which he did not meet with a single genuine case. The anopheline mosquitoes of the Amazon are of three species only, *Cellia albimana*, *C. argyrotarsis*, and *Stethomyia nimba*.

Leishmaniasis is a common and important disease in the Amazon basin. It goes by various names, chiefly that of *feridas bravas*, or angry sores. In the hospitals of Manaos numerous cases were seen. A common form, often mistaken for syphilis, is an ulceration of the nares which often extends to the mouth and throat. The disease shows no tendency to spontaneous cure. The most efficient treatment is by local injections of tartar emetic [details not given] as practised by Dr. Gaspar Vianna. Another curious affection seen amongst the Indians on the river Purus is *purú-purú*, signifying "spotted." It is characterized by black spots on the skin, surrounded by whitish areas due to disappearance of pigment. The cause has not been determined with certainty. Ankylostomiasis is a trouble in mining regions on the Rio Negro, and leprosy and yaws are also met with.

Amongst animal diseases mal de caderas takes a principal place, and the consequent mortality amongst mules is a serious inconvenience where rubber has to be transported on mule-back. In such localities the price of a mule may be nearly a million reis (about £100). The author considers the capybara to be the host of the parasite, because he came across the bodies of a large number of these animals, in places where the disease was causing considerable damage at the time among the equines.

He concludes with some emphatic remarks on the economical necessity for bettering the sanitary conditions of this immense tract of country.

J. B. Nias.

Otis (Elmer F.). **Diseases of Porto Rico.**—*Jl. Amer. Med. Assoc.* 1913. Sept. 27. Vol. 61. No. 13. pp. 1031-1034. With 1 chart.

A short account of some of the diseases found in Porto Rico. Tuberculosis, typhoid and malaria may justly, the author states, receive first mention, while rickets, bronchopneumonia, angina pectoris, venereal diseases, tumours, meningitis and a variety of chronic rheumatic infections are not unfrequently met with. As regards tropical diseases ankylostomiasis, as is well known, is common, while lately it has been shown that sprue is more frequent than was previously supposed. Epidemics have from time to time prevailed. Yellow fever, however, has never appeared on the island since the American occupation. Cholera once visited it in 1845 and a small epidemic of plague in 1912. This was quickly subdued, a specially vigorous campaign against rats being adopted.

G. C. L.

Deeks (W. E.) & Baetz (W. G.). **An Analysis of Five Hundred Fatal Medical Cases in the Tropics.**—*New York Med. Jl.* 1913. Aug. 30. Vol. 98. No. 9. pp. 401-407 & Sept. 6. No. 10. pp. 462-465.

Five hundred fatal medical cases in the Panama Canal Zone are analysed. The aim of the authors has been to ascertain primarily the errors made by the medical staff of the Ancon Hospital in determining the actual cause of death among a population in the Tropics where the negro and mulatto outnumber the white in a ratio of about six to one. Without autopsy, they say, the cause of death is correct in only some 80 per cent. of the cases; with autopsy findings, in something over 96 per cent. The great majority of failures to diagnose clinically is due, according to the authors, to neglect of some elementary routine examination, either physical or laboratory.

[The analysis brings out strikingly how common ordinary diseases, such as tubercle, act as a cause of death in the Tropics.]

G. C. L.

Maxwell (James L.). **Some Diseases, the Parasitic Causes of which are Obscure.**—*China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 279-285.

Febrile tropical splenomegaly, fistulous disease of the buttocks, and rat-bite disease are discussed.

Reports from Ichang, Soochow, Weihsien, Wuhu and Formosa indicate that enlargement of the spleen associated with ascites, not due to *Schistosoma japonicum*, kala azar, or other well known causes is prevalent. Wooley in the Philippines has also described such cases, as have authors in Egypt and elsewhere. The disease, as Maxwell himself has observed it, has the following symptoms :—

"1. An insidious onset. Probably some irregular fever is always an early symptom.

"2. Enlargement of the spleen; always considerable, sometimes enormous.

"3. Cirrhosis of the liver, in early cases hypertrophic, in late cases usually atrophic. It is probable that the enlargement of the spleen is always primary to that of the liver.

"4. Anaemia, a roughly proportionate decrease of all the cellular elements of the blood, with a slight relative lymphocytosis.

"5. Periodic attacks of irregular fever.

"6. In the late stages ascites, often extreme, with some not very well marked general anasarca towards the close.

"7. A tendency to progress to a fatal termination, though in the early stages of the disease there may be intermissions of considerable length.

"8. More rarely, and this especially in young subjects, the disease appears to run an acute course, terminating fatally in a year or more.

"9. The disease is found at all ages and in both sexes, but is particularly an affection of the prime of life."

No organisms resembling leishmania have been seen in any of the cases. [See also this *Bulletin*, Vol. 1, pp. 112–113.]

As regards fistulous disease of the buttocks, this is rare, the author seeing only two cases or so a year in an in-patient clinic of 2,700, and an out-patient clinic of twice that number.

So far all the cases have occurred in adult males, the patients coming with the statement that the disease began from a year to several years previously with an ordinary fistula-in-ano. On examination one or both buttocks are found to be riddled with sinuses forming a veritable mass of passages under the skin of the part, each frequently being marked on the surface by massive induration of the skin and subcutaneous tissues. Small openings, where the skin has given way, are to be seen and these exude a serous pus. The disease is almost painless but gives rise to considerable discomfort in sitting. As regards pathology, this is chiefly negative. It is not syphilitic—or at least it fails entirely to react to anti-syphilitic treatment. It is not tuberculous and so far as the author has been able to discover is not mycotic. [See also this *Bulletin*, Vol. 1, p. 456. The presence of entamoebae noted by the author in some of the cases can hardly be recognised as causative.]

Rat bite disease has been seen on a few occasions, the course followed in these cases being very similar to that described by Scheube and others. In one case, however, that of a Chinaman, there was the following peculiar history. The patient had been bitten some days before by a rat on the right hand. The wound was dressed at once, but a lymphangitis followed and, when the patient was seen, definite hard and painful lumps were felt in the lymphatics of the arm with red patches in other places of the body. The axillary glands were little enlarged. The case suggested at once one of sporotrichosis, and potassium iodide rapidly reduced the size of the lumps. The patient left the hospital before being completely cured but returned again shortly after with a recurrence of the trouble. A further course of potassium iodide completely cured him. The author thinks, therefore, that the case may have been one simply of sporotrichosis but, if so, he considers that the germ was inoculated by the bite of the rat. He suggests further investigations on the subject.

G. C. L.

Breinl (Anton). **Two Cases of "Climatic Bubo."**—*Australian Inst. of Trop. Med. Report for the Year* 1911. pp. 27-29.

Two cases of climatic bubo, clinically very similar and with the same history, were admitted to the Townsville Hospital. The first was a labourer 28 years of age. He had been working previously for years in different parts of North Queensland. Three weeks before

his admission to the hospital he noticed swellings in both groins, which became very painful on pressure, the pain increasing when he walked about. As the swellings did not disappear after various applications, the patient sought admission to the hospital.

In both groins one gland of the size of a hen's egg could be felt, besides lymph glands of the size of a pigeon's egg. Over the larger lymph glands fluctuation could be made out. The body temperature was only slightly raised; it never surpassed 99·8° F., being slightly higher in the evening than in the morning.

Neither the examination nor the history of the case revealed anything which might have accounted for the swelling of the lymph glands.

The large lymph glands on both sides were removed. On cross section these offered a similar microscopic appearance. The surrounding connective tissue capsule was much thickened, and the lymph gland was intersected by a well developed frame-work of fibrous tissue. All through the surface layers of the gland haemorrhagic infiltration was noticed, extending into the central parts. Here and there were smaller or larger irregular areas, showing suppuration, some of these containing liquid pus, while others showed only softening of the lymph tissue. Some of the smaller lymph glands which were extirpated at the same time were microscopically of normal appearance.

The other case was of a similar nature. With the exception of *Staphylococcus albus*—evidently a skin contamination—no bacteria grew on the different culture media. This finding, together with the histological features of the glands, shows according to the author, beyond doubt, that the clinical diagnosis, climatic bubo, was correct and that this disease does occur in Northern Queensland although rare.

G. C. L.

Ziemann (H.). **Zur Therapie der Menstruationsbeschwerden der Frauen in den Tropen.** [On the Therapy of painful Menstruation in the Tropics.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. July. Vol. 17. No. 13. P. 459.

Menstruation in white women in the tropics is more difficult than at home. The author advises the use of a drug named "Eumenol." This substance is derived from the root of a well known Chinese plant named "Tangkuive," variously described as belonging to the Natural orders *Araliaceae* or *Umbelliferae*. The tincture is a useful form to adminster it in, this being bitter and aromatic, or it may also be put up in dried tablets of 0·3 grammes. It is said to be specially useful in nervous dysmenorrhoea.

G. C. L.

Hadwen (Seymour). **On "Tick Paralysis" in Sheep and Man following Bites of *Dermacentor venustus*.**—*Parasitology.* 1913. Oct. Vol. 6. No. 3. pp. 283-297. With 2 plates.

The author shows that tick paralysis is found in sheep and probably other animals in British Columbia as well as in man. [For its occurrence in man see this *Bulletin*, Vol. 2, p. 204.] The tick implicated is the *Dermacentor venustus*, Banks. The disease is usually of short duration, and is benign in character, but occasionally persists

for long periods and may terminate fatally. The symptoms in lambs develop gradually, the first noticeable being restlessness, the animals at times struggling about and bumping against obstacles. Later on they fall down and cannot rise, and at this stage they struggle a great deal. As paralysis advances they cease struggling but still have a wild eyed look. After recovery begins, attempts are made from time to time to rise and these continue until they are able to stand, after which recovery is very rapid. The causative agent has not been discovered and the disease has not been reproduced by inoculation. The most likely hypothesis is that the tick injects a toxin which gives rise to symptoms appearing coincidently with its complete engorgement. In three consecutive cases experimentally produced by the author in lambs, paralysis occurred six to seven days after the ticks were put on. In sheep the bite of the tick is usually along the backbone and possibly the point of attachment may have some bearing on the symptoms and severity of the case. Whether other species of ticks may produce similar diseases is not so far known.

G. C. L.

Hadwen (Seymour) & Nuttall (G. H. F.). **Experimental "Tick Paralysis" in the Dog.**—*Parasitology.* 1913. Oct. Vol. 6. No. 3. pp. 298-301.

A positive experiment carried out in Cambridge upon a dog experimentally infested with a single *Dermacentor venustus* obtained from Canada is recorded. The symptoms were similar to those observed in sheep in British Columbia by Hadwen. [See above.] An examination of the dog's blood showed no parasites of any sort and inoculations into other animals proved negative. The authors discuss the question of the symptoms being due to a toxin or to infective germs and hope, in the course of further investigations, to throw more light upon this interesting affection.

G. C. L.

Cooley (R. A.). **Notes on Little Known Habits of the Rocky Mountain Spotted Fever Tick** (*Dermacentor venustus*, Banks).—*Jl. Economic Entomology.* 1913. Feb. Vol. 6. No. 1. pp. 93-96.

During investigations of the Rocky Mountain spotted fever tick (*Dermacentor venustus* Banks) in the Bitter Root Valley, Montana, in co-operation with the Bureau of Entomology, interesting observations have been made on the waiting habits of this species. In numerous instances in nature, and in out of door conditions which very closely resemble nature, adults of this tick have been found in a definite "waiting attitude," which the author regards as habitual. A dead, bare, upright twig, or grass stem, is usually selected and, with the capitulum directed downward, the support is firmly grasped with the third pair of legs, these legs serving as the only means of attachment while the first, second and fourth pairs are extended and waved, in reaching for animals which approach. Prepared in this manner, it is easy for the tick when a suitable host appears to attach itself to it.

G. C. L.

Fricks (L. D.). **Rocky Mountain Spotted (or Tick) Fever. Sheep Grazing as a Possible Means of Controlling the Wood Tick (*Dermacentor andersoni*) in the Bitter Root Valley.**—*U.S. Public Health Rep.* 1913. Aug. 8. Vol. 28. No. 32. pp. 1647-1653.

The author states that since the discovery that Rocky Mountain spotted fever is transmitted by the bite of the wood tick, *Dermacentor andersoni* (=*D. venustus* Banks) different measures have been proposed for its eradication. These, summarised, are as follows :—(1.) Clearing and cultivation of tillable land. (2.) Burning over foothills and "slashings." (3.) Killing of the small wild mammals. (4.) Dipping of domestic animals in arsenical dip. (5.) Spraying and removing ticks by hand from domestic animals.

Each of these is useful in its way and possibly might if judiciously employed over a suitable and limited territory eventually eliminate the tick infection. Nevertheless all these methods have been attempted on the west side of the Bitter Root Valley for three years or more without greatly diminishing the number of ticks to be found or the number of deaths from spotted fever. The author therefore carried out a series of experiments on sheep grazing as a possible means of controlling the tick. A description of these is given. In his summary on these experiments the author states that : —(1.) Over 87 per cent. of 295 ticks placed in the wool of unshorn sheep were recovered dead. (2.) The majority of the ticks recovered from sheep grazing naturally over tick-infested territory were found dead. (3.) Many of the engorged females recovered appeared not to have been fertilized. (4.) Comparatively few ticks, either alive or dead, were found on the sheep after they had been sheared.

He believes therefore that these findings warrant the continuation of the experiment by the placing of a herd of 2,000 wethers on some selected range west of the Bitter Root River as early in the spring as possible. The selected range should be closely grazed until shearing time, and then, if desired, the sheep could be sheared, dipped, and transferred to the east side of the valley without danger of carrying wood ticks, or returned immediately to the range until the experiment is completed.

Four factors are to be considered in the sheep-grazing experiments :—(1.) The removal of undergrowth and the consequent destruction of "good tick country" by close grazing. (2.) The destruction or removal of other large mammals, domestic and wild, from the sheep range. (3.) The destruction of ticks themselves by the grazing sheep. (4.) The placing of the problem of tick eradication on an industrial basis.

If this can be done, the author believes that the problem might solve itself and the danger from Rocky Mountain spotted fever, which has hung like a blight over the eastern slopes of the Bitter Root Valley for 30 years or more, might possibly be abolished.

G. C. L.

Ziemann (H.). **Zur Pathogenese, Diagnose und Prophylaxe der Tuberkulose in den Tropen.** [Pathogenesis, Diagnosis and Prophylaxis of Tuberculosis in the Tropics.]—*Centralbl. f. Bakt.* 1 Abt., Orig. 1913. Aug. 4. Vol. 70. No. 3/4. pp. 118-141.

The author reviews the published data on tuberculosis amongst native races throughout the world. He gives in some detail the history

of Kamerun in this respect—at the beginning of the century the disease was not found—and the results obtained by him with von Pirquet's reaction, carried out on Bantus, Hottentots from South-West Africa, Hausas and Syrians in that country. His conclusions are to the following effect :—

Tuberculosis amongst native races has made considerable progress, varying in different districts. In places where no immunity has been produced in consequence of long presence of the disease it tends to be acute. The liability of natives is increased if they are herded in close association with Europeans, giving up their old habits and living in less good conditions, especially in the case of the negro owing to his strong disposition to catarrhal affections of the air ways.

The spread of the disease is favoured by trading foreigners ; in East Africa by Indians, in West Africa by the Syrian ; to some extent also by the Hausa, but in Ziemann's experience, only slightly by the European, who has already been medically examined in Europe.

For native populations the ophthalmic reaction is less suitable for diagnosis than v. Pirquet's cutaneous reaction, on account of the proneness of the negro to episcleritis.

Corresponding to the small incidence of tuberculosis amongst the negroes in Kamerun—a number of tribes appear to be still quite free—there is an almost complete absence of tuberculosis of cattle in Central Africa. Owing to the great danger of tuberculosis getting a further hold on the natives, and seeing how difficult it is to fight it in the tropics, Ziemann makes the following strong recommendations :—

1. The Europeans sent out should be healthy and have been found to be free from tuberculosis at a previous examination. Every case of open tuberculosis should be treated at once and sent back as soon as possible if there are facilities for transport. Naturally Europeans would not be sent home in the winter.

2. The European and native populations should receive instructions on the nature and prevention of tuberculosis.

3. Every case diagnosed in the natives should be notified to the authorities and kept under observation and treatment. There should be very strict sanitary supervision of all natives who are employed in trade for Europeans, and diagnostic tuberculin reactions should be used on them.

4. The standard of housing, dressing, and living should be raised amongst the natives. Tuberculosis in Africa like malaria is chiefly a disease of want of civilisation (*Unkultur*).

5. Persons passing the boundaries of a colony or foreigners present in it should be subject to strict supervision ; for instance Hausas, Syrians, Indians, etc., and all foreigners who are not certainly healthy should be turned back. This recommendation is also useful for the combating of other disease, such as sleeping sickness, and with good-will can be easily carried out.

6. General progress in the same direction of all nations possessed of colonies in Africa.

7. Increase of the sanitary personnel in the whole of Tropical Africa.

8. More careful examination of flesh, and veterinary supervision of herds.

A. G. B.

Book Reviews.

East Africa Protectorate. **i. Nairobi Laboratory Reports for Half-year January-June 1912.** Vol. 3. Pt. 1. By R. Small [Acting-Govt. Bacteriologist] and V. H. Kirkham.—73 pp. 4to. 1913. Printed by Waterlow & Sons, Ltd., London. **ii. Nairobi Laboratory Report for the months July-December 1912.** Vol. 3. Pt. 2. By Philip H. Ross [Govt. Bacteriologist] and V. H. Kirkham, Govt. Analyst. v. 72 pp. 4to.

These two volumes contain the reports of the Nairobi Laboratory and of the Government Analyst for 1912. Part 1 deals with plague, leprosy, trypanosomiasis, and spirochaetosis, and includes an investigation of an alleged outbreak of plague amongst the Laitokotoh Masai. A disease known by the natives as "Ngawavi" has been described amongst these people. It is a fatal disease of five or six days' duration, and is distinguished by painful glandular swellings. A careful examination of six cases by Small revealed the fact that they were really malignant malaria. The conclusions arrived at, however, were that a plague-like disease did exist in the hills in an endemic form, but that the native name "Ngawavi" is apt to be used for any grave illness. Part 2 contains articles upon dysentery and malaria. Out of 116 cases in which malarial parasites were found, 92 were malignant, nine benign tertian, and five quartan. Plague broke out in the Indian Bazaar in Nairobi on September 5th, 1912. As in previous outbreaks search produced many dead rats, some in various stages of decomposition, from beneath the floors of buildings in the bazaar.

Probably owing to the prompt use of Haffkine's vaccine the number of human cases since the outbreak began was small. Besides this outbreak, what were probably two small extensions occurred some miles away. In one case the disease apparently began in a grain mill in another native village.

Some experiments were carried out with *Glossina longipennis* to see if this fly conveyed trypanosomes. These were few in number and are not very conclusive.

G. C. Low.

Strachan (Henry). [C.M.G.] **Lessons in Elementary Tropical Hygiene. For the use of Pupils in Tropical Schools.**—xi., 116 pp. With 6 plates. 1913. London: Constable & Co., Ltd. [1*s.* net.]

The contents of this little work are as follows :—

Diseases and how to prevent them.—Necessity for the study of hygiene—Parasites—"Germs"—The Blood—Carriers of Diseases—Malaria and Mosquitoes (Lessons I to VII). Air, water, food (Lessons VIII to X) The dwelling—Disposal of refuse—Clothing—Habits and Customs (Lessons XI and XII). Quite a wide series of subjects it will thus be seen, and suitable as far as one can judge for use in advanced schools. The author's object was to impart in non-technical language a knowledge of the causes of the principal diseases in tropical countries and of the importance of strict personal cleanliness in their prevention. Some simple diagrams are given to illustrate the text and to assist the teachers in making blackboard drawings for their classes. It will certainly do the average pupil no harm to see magnified illustrations, such as are given in this book, of his ecto-parasites, fleas, lice, and bugs, but it is doubtful what useful service will be gained by the pupil gazing on a larval filaria depicted as twice the size of a whip worm, or other objects, which are only to be seen by the aid of a compound microscope. It is well to remember that the motto for all these primers should be simplicity. If this is attained only good can result from instilling sound sanitary knowledge and principles into the minds of the growing generation.

G. C. L.

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